Smithsonian

June 1988

Living wild

Once-captive chimps turn over a new leaf (p. 36)

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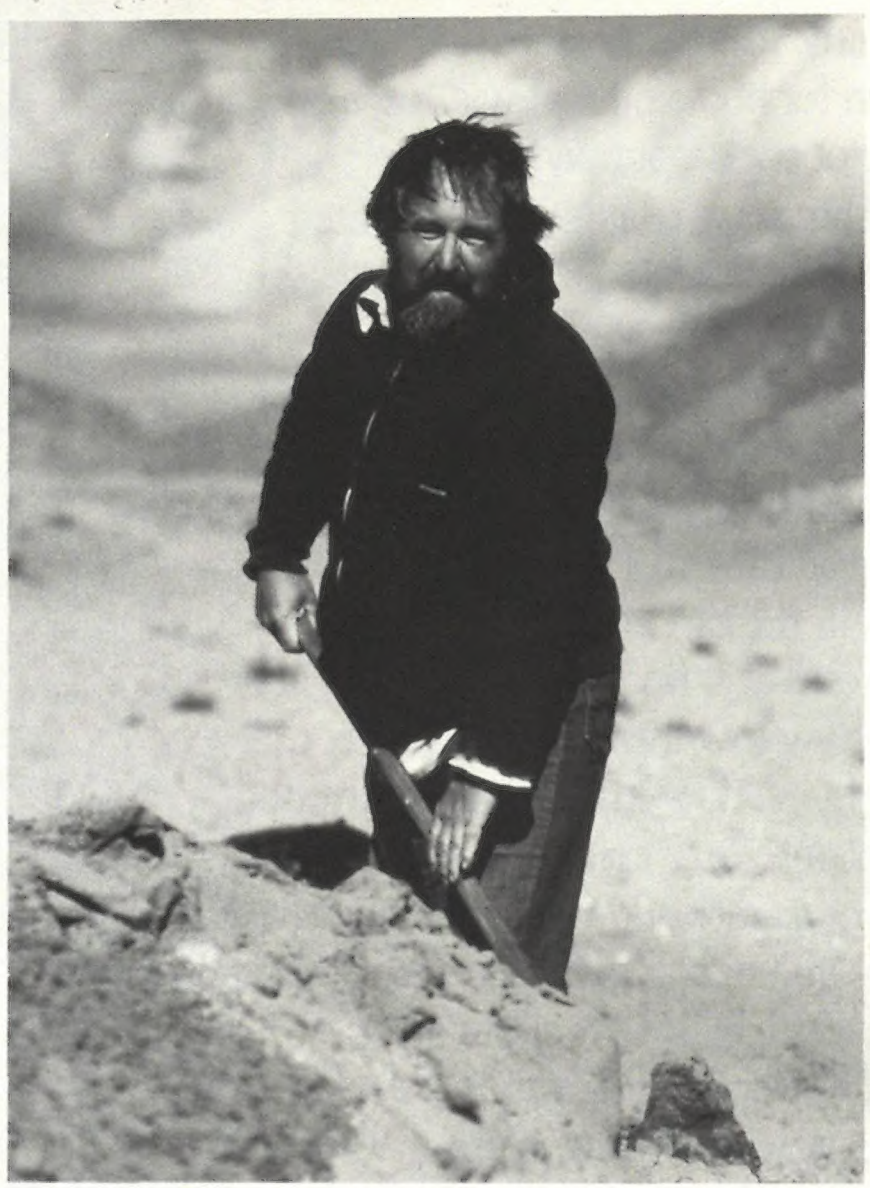

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June 1988

Smithsonian

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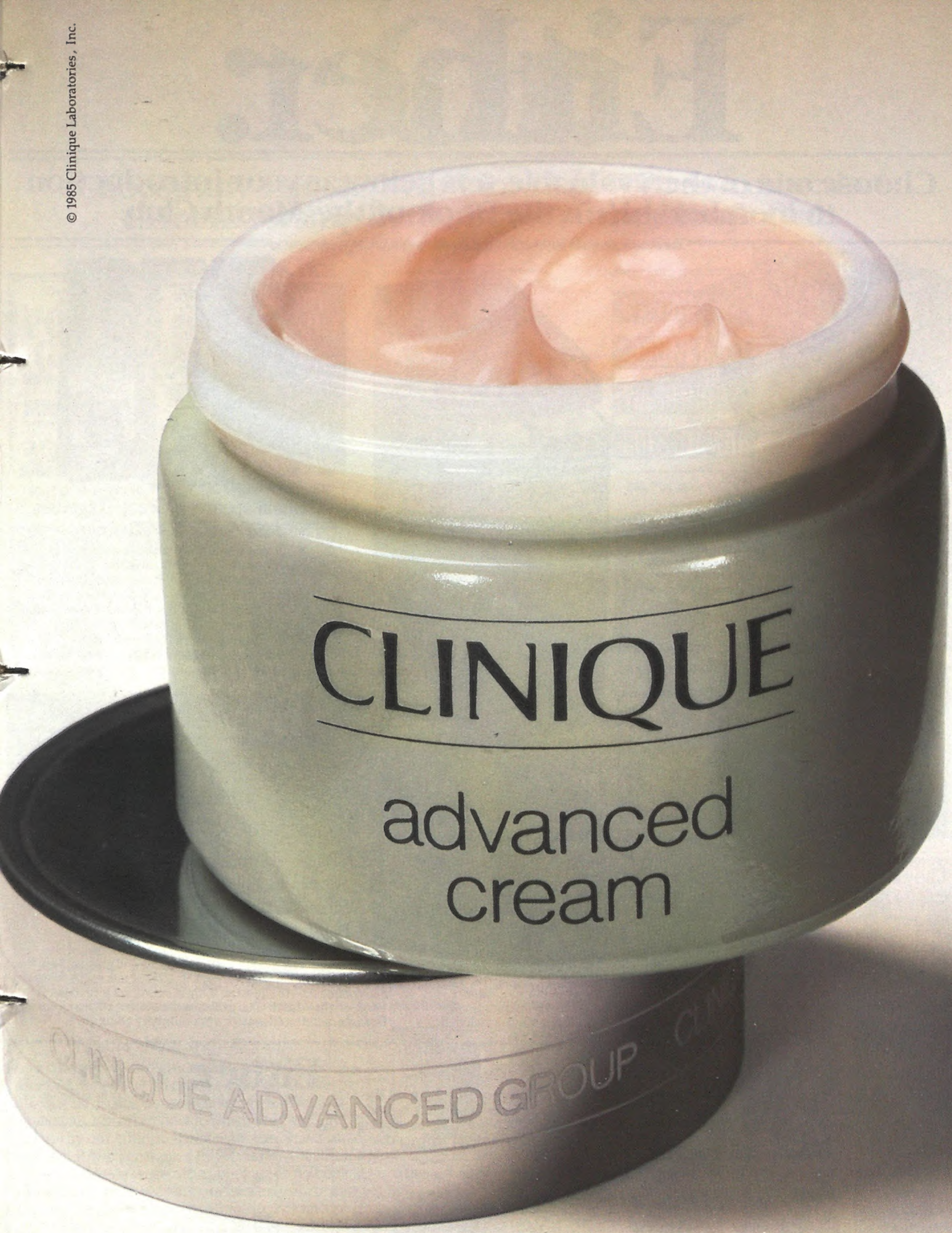

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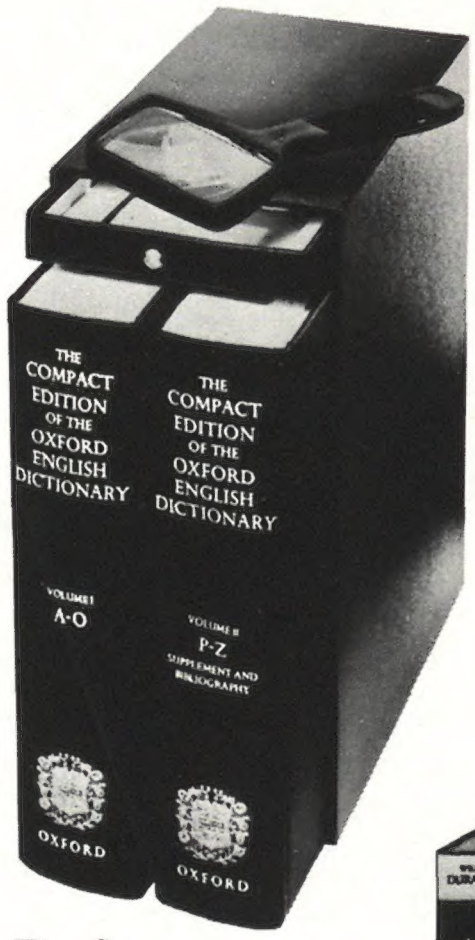

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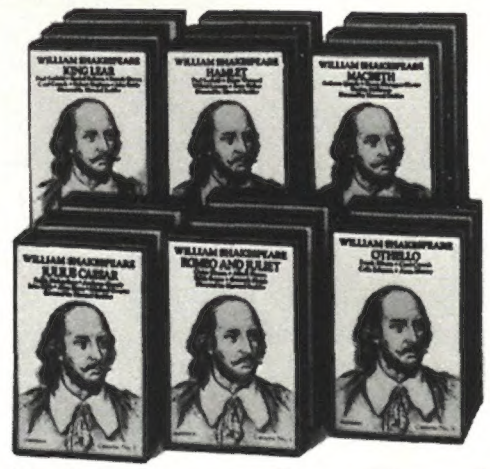

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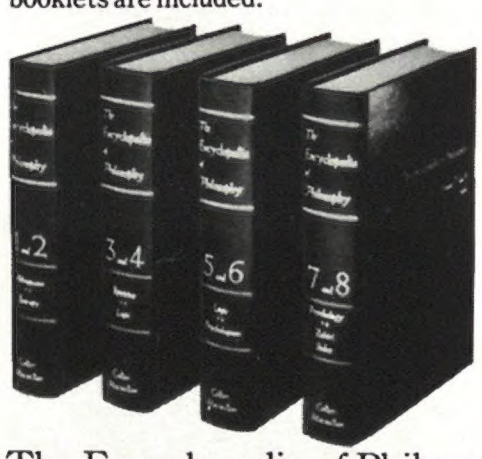

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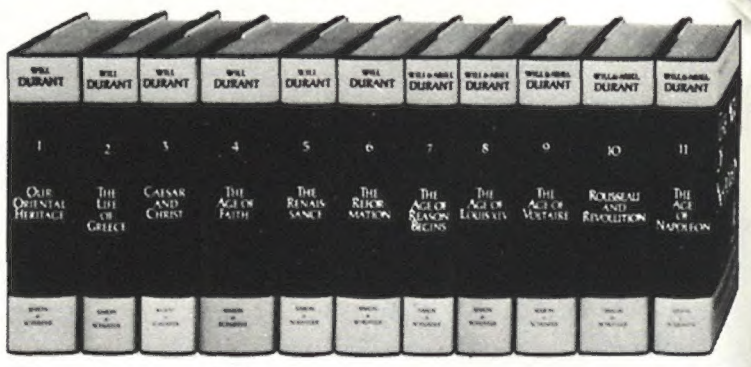
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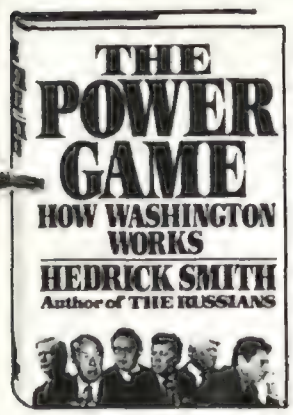

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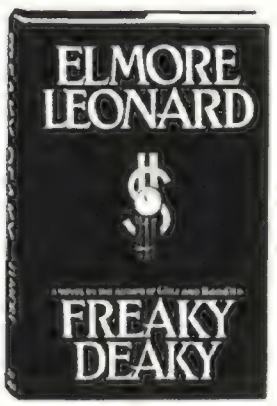

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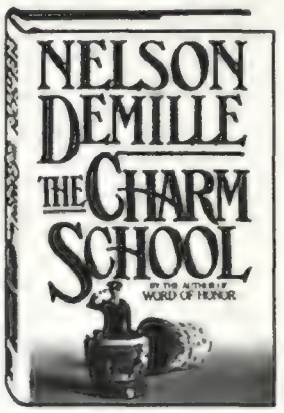

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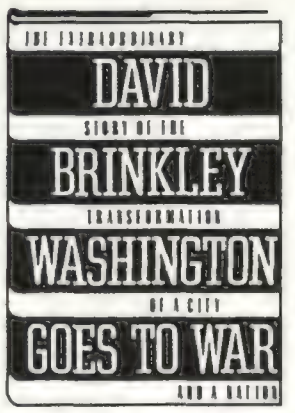

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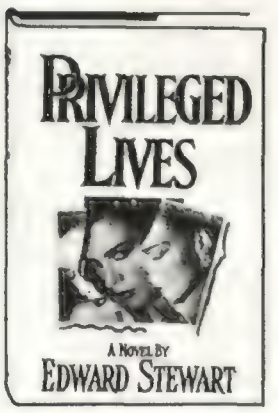

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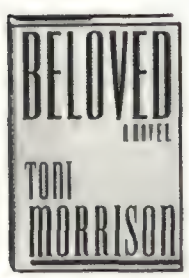

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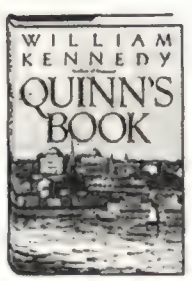

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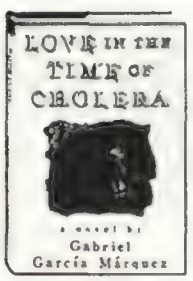

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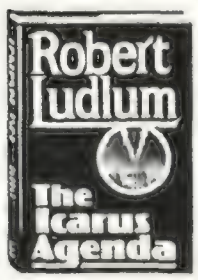

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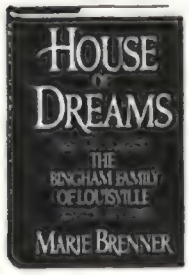

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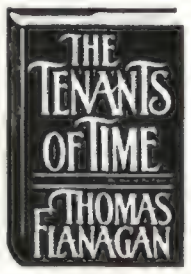

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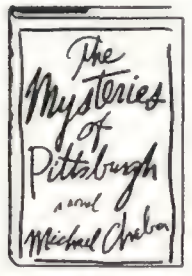

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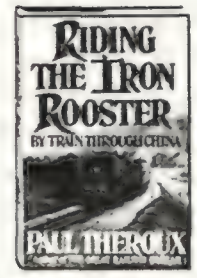

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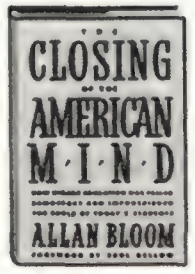

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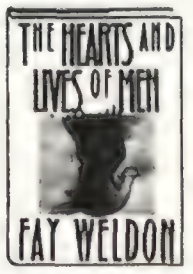

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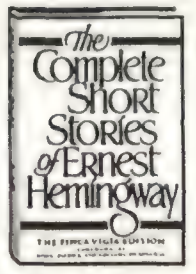

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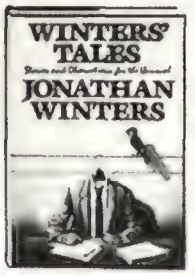

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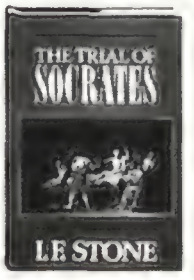

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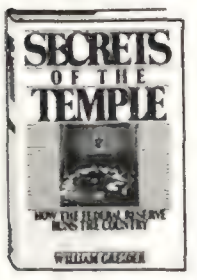

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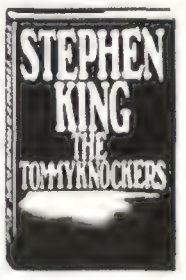

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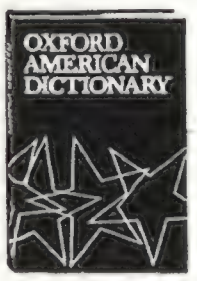

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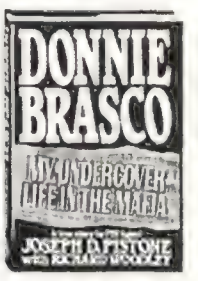

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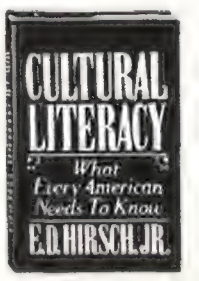

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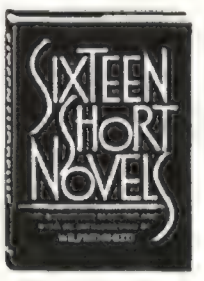

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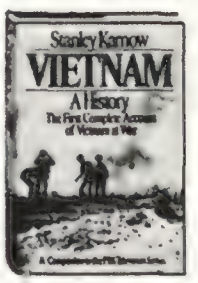

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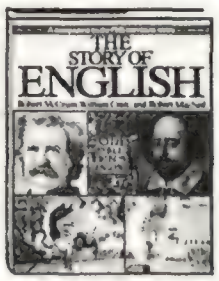

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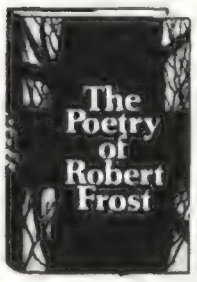

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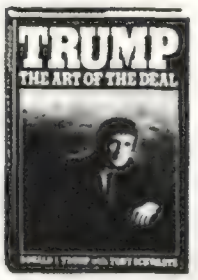

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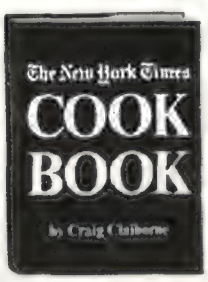

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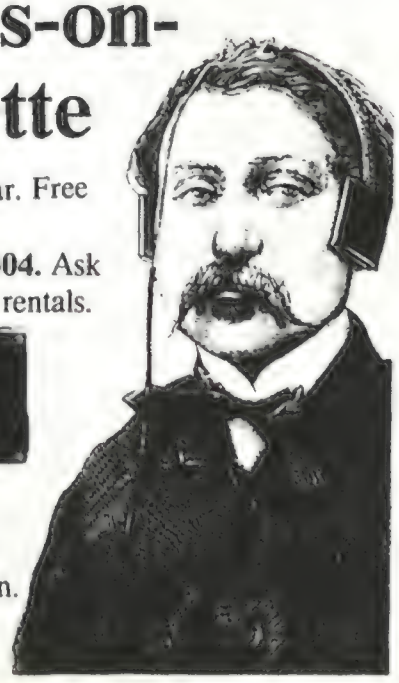

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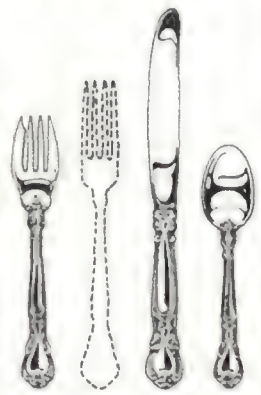

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Secretary Adams' comments

Smithsonian horizons

An exhibit of artifacts made by blacks reminds us that the Smithsonian needs diversity to meet its responsibilities

For a time earlier this year, a little exhibit entitled "Industry, Skill, Ingenuity—Southern Black Expositions 1880-1915" could have caught the eye of an attentive visitor to the National Museum of American History. In spite of, or perhaps because of, the mere remnants with which the theme could be illustrated, the single display case offered a poignant vignette of one of the grimmer aspects of the American democratic experience. Resurrected there, if only in fragments, was a wider range of nearly forgotten efforts and aspirations, in the end held in check by the larger realities of judicially sanctioned segregation and the post-Reconstruction backlash.

Contained in the case were a few objects—from black participants in the New Orleans World Industrial and Cotton Exposition of 1885 and in the First Industrial Exposition of the Colored Citizens of the District of Columbia held in 1886—that were among the first sought by the Smithsonian to document black history. Together with a handful of works of fine craftsmanship, there were patent models of a combined cotton planter, fertilizer and distributor, and of a device for removing kernels from an ear of corn (*Around the Mall and beyond*, May 1988).

Accompanying written records illuminate what can be surmised from these objects. We learn that needlework was a major focus in the Southern international fairs, while paintings, sculptures, literary works, clothing, tools and household implements also were exhibited. Some 50 patent models and 351 patent drawings were among the nearly 10,000 objects displayed at the Jamestown Tercentenary Exposition in 1907. The precedent of placing black exhibits in a separate structure, designed by black architects and built by all-black construction crews, had been established at the Atlanta Cotton State and International Exposition of 1895.

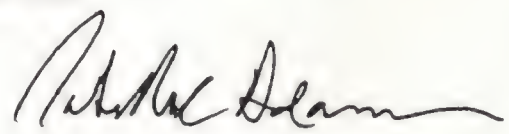
Despite this reinforcement of the ideology of segregation, it is ironic that the Southern fairs were the first major outlets that were open to blacks. The Centennial Exposition held in Philadelphia in 1876 had virtually excluded them, and few of their works received approval from all-white screening committees for the World's Columbian Exposition of 1893 in Chicago.

The dominant black attitude apparently was to seize an opportunity to demonstrate "progress of the mind and hand." Black exposition companies enlisted the support of prominent educators, professionals and craftspeople, and were able to call upon Booker T. Washington, founder of the Tuskegee Institute, as their leading spokesman. The need to search for wider recognition and economic opportunities prevailed, in other words. While that compromise might appeal to few under modern circumstances, it is also ironic that, as a brochure accompanying our exhibit noted, "Neither before that period nor since have such extensive displays of Afro-American objects been available for public viewing."

Modest as it was, the exhibit cast light on broader questions that the Smithsonian's collections and exhibition policies must address. We need a matrix of categories that is at once inclusive and sensitive—historically, geographically, economically, technologically, esthetically and, most difficult because most value-laden, culturally—against which to project our appraisals of what we have done and our plans for future improvements.

Can we adequately document the home, the workplace, the highlights of entertainment and favored outlets of leisure, the phases of the individual life cycle, the significant public amenities, institutions and organizations? Are commonplace objects as well reflected as those that are, by standards subject to change, outstanding? How well equipped are we to portray not just material activities and accomplishments but ideals and movements—the role of churches, the contributions of corporate vision and private philanthropy, the struggle for civil rights and women's equality, the goals and ethics rather than merely the attainments of science? And how in particular, as this exhibit reminds us, do we strive to attain these goals of representation, not for the melting pot that we have not become, but for all of the ethnic communities that contribute to our lives and outlooks?

It is naturally easier to ask such questions than to answer them. But one thing is obvious: the Smithsonian needs its own internal diversity in order to meet its responsibilities to the whole of the American public. Accordingly, we are currently making every effort to increase the representation of minorities and women on the Smithsonian's professional and administrative staff. Located preponderantly on the Mall, in the heart of the nation's capital, we can do no less.



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Letters to the Editor

Foxes

Dear Sir: Years ago our home was in glorious woods of stately beech, wild cherry and sugar maple trees, with a small lake. One twilight, as I tossed table scraps across the fence for the "wild things," a vision of fur darted past toward the feast—a pair of red foxes. After a time we located the den at water's edge, in a high bank that was camouflaged by shrubs.

They appeared every evening and eventually gathered the courage to come around in broad daylight. The male, dominant, dined first, while the female patrolled, now and then crouching in submission to his presence.

As time went on, a congregation gathered—raccoons, opossums, as well as all their young. No growling or challenges, truly a "peaceable kingdom."
Alta B. Young
Greenwood, Indiana

Marbles

Dear Sir: As a child of the Depression, I grew up playing marbles. The game put me to one of my first moral tests. My mother, convinced that playing "for keeps" was gambling, forbade me to do so. But refusing to play for keeps was admitting to being a sissy. I solved my dilemma by playing only "for fun" against boys better than I, and playing "for keeps" against boys whom I knew I could beat.
Robert Hager
Goleta, California

Dear Sir: In my youthful days in the early '20s, every boy had a pocket full of marbles, along with a skate key. The girls had a skate key on a string hung around their necks, and carried a bag of jacks with a little rubber ball.

At recess, we could hardly wait to draw a circle in the dirt, and the marble games would commence. Our favorite expression was "knuckle down" (no shooting from midair).

My brother always went to school with a cigar box under his arm. He might forget his books, never the box. It had a hole cut in the lid, and the object was to drop a marble from waist high into the hole. If it went through the hole, it was worth five marbles; those that didn't make it belonged to my brother.
F. W. (Pete) Parkhouse
Sandpoint, Idaho

Dear Sir: On rare visits to my grandfather's house, 50 years ago, some 30 miles inland from Blackpool on the northwest coast of England, we would take Sunday morning walks. It was then that I saw marbles played regularly by adults—off-work coal miners who apparently took the game very seriously. Ever since, I've wanted to know the rules, but I never got involved. Now, with your article, I'm an expert.
Ron Ashworth
Rouses Point, New York

Dear Sir: In Stillwater, Minnesota, in the early 1920s, the game of marbles was extremely popular with my friends and me, but in a different form from that discussed by Paul Dickson.

Our game was played on the wide and sloping cement sidewalk that ran alongside Hoehne's grocery. One lad, with legs spread-eagled, would sit in the middle of the walk, an agate in the seam of the cement in front of him. The other boys would move several seams away and roll crockies, or porcelain marbles, down the sidewalk in an attempt to hit the agate. The lad sitting behind it hoped, of course, that he would collect a goodly number of marbles before his was hit.

When someone succeeded in striking the target, he replaced the boy whose agate had been struck. The latter would then gather up the marbles between his legs and join his fellows (girls never played) in attempting to hit his replacement's target.

The action was fast and furious and lasted until it was time for school or supper. If one were lucky, he could acquire a sizable collection. I amassed a yellow tin Home Brand Crackers box

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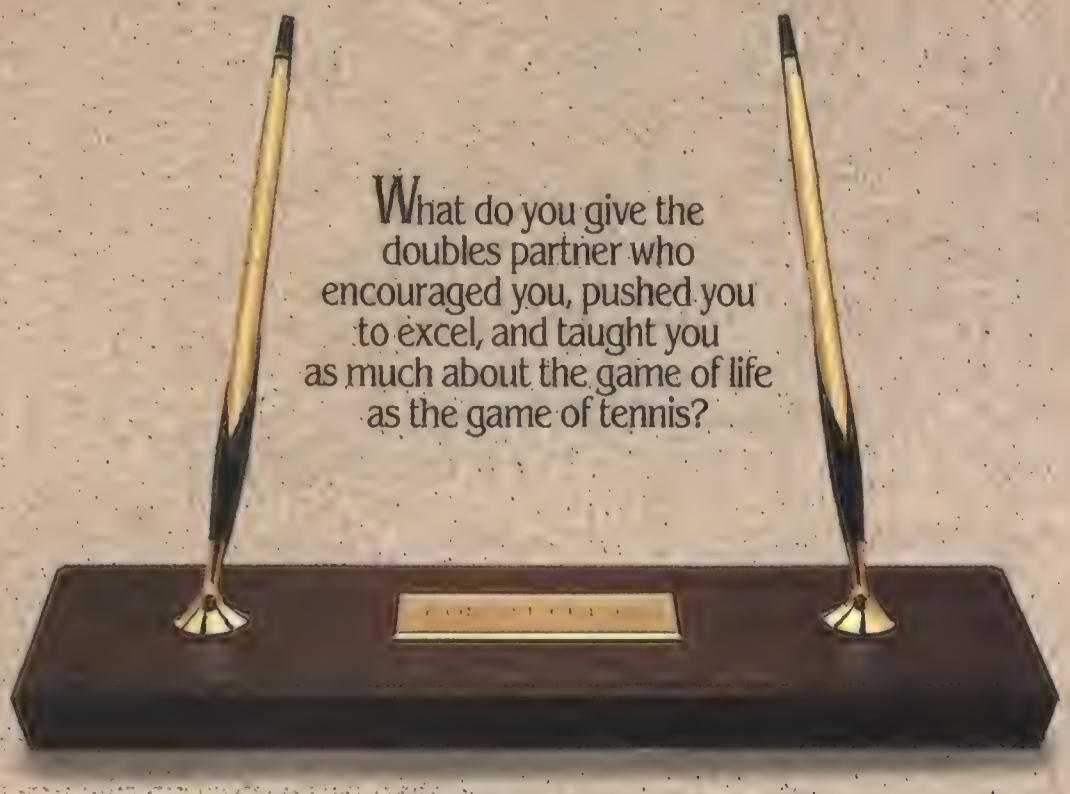
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full of all kinds of marbles. Next to my baseball glove and bicycle, they were my most prized possessions.
Merrill E. Jarchow
Northfield, Minnesota

Dear Sir: I still have a box of the real aggies my father brought me from Germany around 1929. My favorite shooter was absolutely deadly. Every time it hit another marble, it would acquire a crescent moon on its surface. When it got to looking too disreputable, I would bury it in my mother's pail of lard overnight. Next day it looked like new!

I really got good at immies. When, after a few hours of play, my pockets would no longer hold my winnings, I'd stuff them past my belt into the legs of my knickers and clink home looking like an arthritic penguin!
Richard (Sure Shot) Mascuch
Morristown, New Jersey

McGruff the Crime Dog

Dear Sir: I was startled to see a picture of this crime dog, McGruff, as he bears a striking resemblance to my dog of the same name.

Your article describes the Crime Dog as "friendly, wise and soulful-looking, . . . trustworthy, honorable, brave . . . [neither] vicious [nor] tremendously smart. [He] wouldn't punish you. And you could trust him . . . . Displaying a winsome fallibility . . . . The shape of his head (long), his height (at least five feet five)." All of these are exact characteristics of my dog. Which brings us to the point.

You state that his breed is undetermined, yet in view of the above it is quite obvious that he is a mastiff [below]. The square muzzle, the wrinkled brow and face, the copious jowls, the noble expression are unmistakable. Especially as few other dogs stand over five feet five.
George R. Martin, M.D.
Minneapolis

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Andrew Jackson in Florida

Dear Sir: The fanciful portrayal of "Billy Bowlegs" on page 142 is not of the Seminole Chief Islapacpaya, the Bowlegs of the First Seminole War. Painted by Charles F. Wimar in 1861, it portrays another Billy Bowlegs: the man who might be considered the last of the great Seminole War Chiefs, Holata Mico, who fought the Americans in the Second Seminole War in the 1830s and '40s, and during the brief third uprising in the 1850s.
Frank Bushnell
St. Petersburg

John Sloan

Dear Sir: We were honored to have a painting of McSorley's included in your article. It captures the light and life here as it was in Sloan's time and as it exists to this day. From the clock above the bar to the soup kettle on the potbelly stove, if Mr. Sloan were to paint the scene "from blessed memory" today and then were to compare that memory with reality, he would find it unchanged.
Matthew Maher, Proprietor
McSorley's Old Ale House
New York City

Dear Sir: The caption for John Sloan's 1910 group portrait *Yeats at Petitpas* identifies only the painter J.B. Yeats and Sloan. John Butler Yeats, lawyer, artist (oils at Dartmouth and at the Abbey Theatre, Dublin), conversationalist par excellence, was father of poet William Butler Yeats, painter Jack Yeats and two immensely skilled daughters, Lilly and Lolly, whose Cuala Press published their father, brothers and, among others, Synge and Pound.

It is interesting to note who the other eight people [right] are: seated on either side of Yeats, two recent Harvard graduates, the future literary critic Van Wyck Brooks and poet Alan Seeger, who was to write "I Have a Rendezvous With Death."

Next is Dolly Sloan, the painter's wife. Standing behind her is Celestine Petitpas, the youngest of three Breton sisters who ran their pension at 317 West 29th Street, where Yeats lived. Smoking his pipe is Robert Sneddon, a genial Scot who wrote popular fiction. In the foreground is Vera Jelihovsky Johnston, a linguist and the niece or cousin—the records seem confused—of the theosophist Madame Helena Blavatsky.

The partly hidden woman is Eulabee Dix, a Midwesterner whose miniature of Mark Twain is in the Smithsonian's National Portrait Gallery; Robert Henri's oil portrait of her, *Lady in Black Velvet*, hangs in Atlanta's High Museum.

The amused man leaning forward is Frederick King, a Connecticut native, a bibliographer and editor who formed a large collection of books and memorabilia about theater and ballet.

These friends' company Sloan must have enjoyed, else they would never have been painted into his Petitpas garden on a summer evening. In the words of Robert Sneddon's widow more than 60 years later, "Nobody thought all those people were going to be famous." Well, not all of them were—but enough.
Robert Gordon
Englewood, New Jersey

Corcoran Gallery of Art

Picture credits

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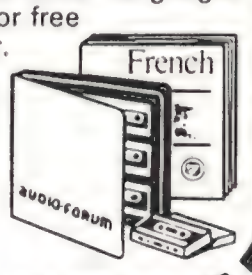

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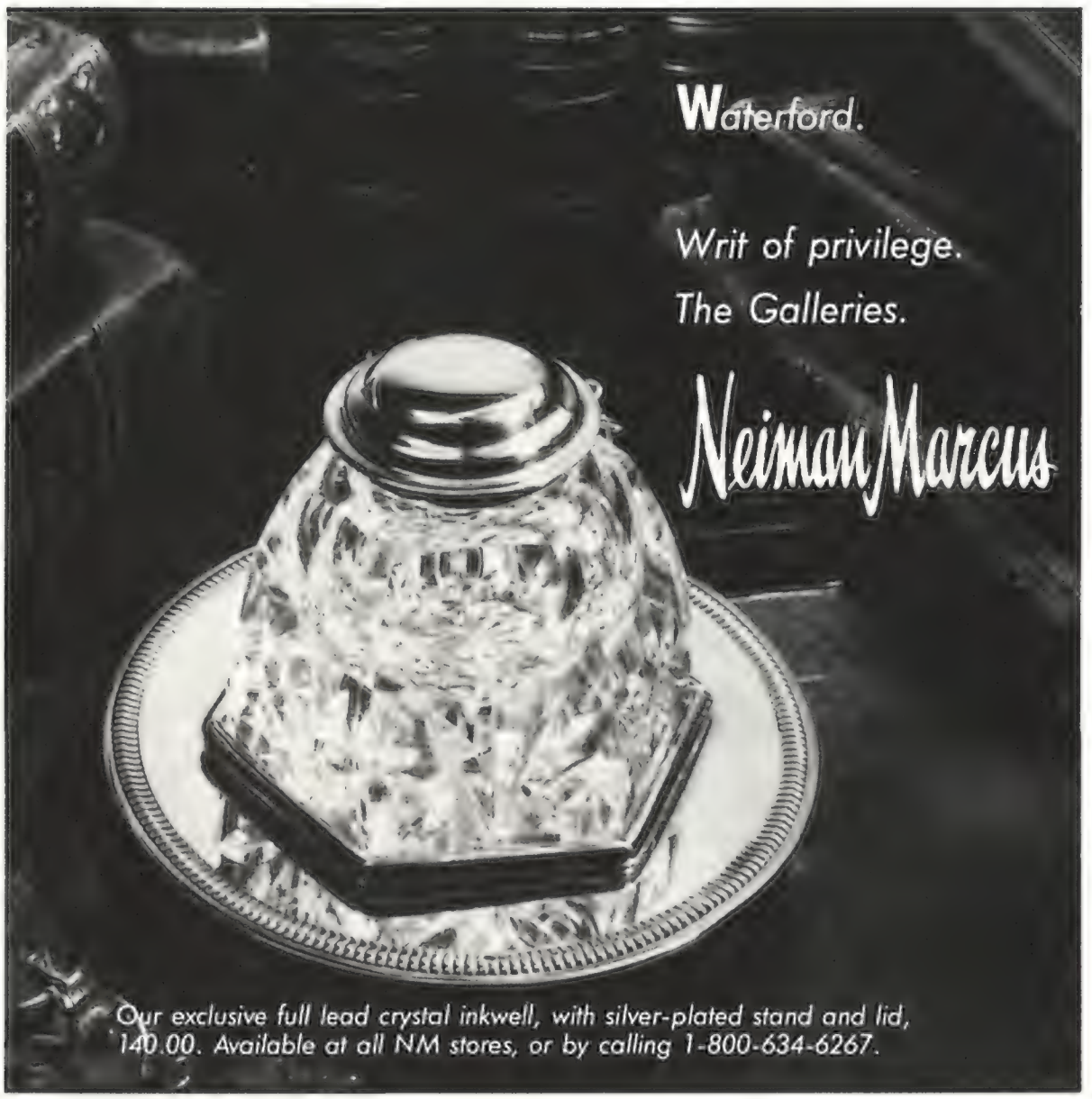
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Around the Mall and beyond

They had laid it on a long white table. It was a little less than six feet long and it weighed close to 250 pounds. You might safely say that it was not in the best of shape.

Not that I expected it to be. I had walked over to the Museum of Natural History with ambivalent feelings—the excitement of tackling a good story tempered by more than usual wariness. I've faced a lot of testing over the years, but until this moment in early April, I had never witnessed the opening of a mid-19th-century cast-iron coffin with what was once a person still inside it.

Now I watched the last preparations with, not dread, exactly, but a remarkable pitch of interest. The coffin came from a Louisiana plantation that had been settled before 1800. It had been accidentally unearthed 25 years ago in an unmarked area of the family burial ground. Family members found a glass plate in the top of the iron casket and took a look. They gazed upon a notably well-preserved gentleman in an old-fashioned frock coat, a white shirt and a bow tie. Without a clue to his identity, they reburied him, closer to the entrance of the cemetery. The family's present generation, however, decided that the mysterious stranger should be identified. Knowing of the Smithsonian's lofty reputation in forensic anthropology, Drew Burk, descendant and historian of the old family, arranged for the uneasy confrontation that I now attended.

Scaly with yellowed rust, the coffin drew all eyes. White-robed acolytes with rubber gloves waited to serve at this ugly, ominous altar. A hush fell upon the congregation of museum specialists and media people. Even the photographers, usually brash in the face of tragedy or comedy, were subdued.

They don't brag about their kids, or make you watch slides of their vacations.

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Drs. Douglas Owsley and Douglas Ubelaker (below), forensic anthropologists at the Museum of Natural History, briefed us. First about the coffin: a Cincinnati firm used to make cast-iron caskets, and they knew of a Civil War colonel, killed at Nashville, who'd rated one. But in approximately 400 salvage excavations of burials in seven Louisiana historic cemeteries threatened by new construction, this was the first iron coffin Doug Owsley had come across. (He is often called in by city or state officials to assist in such excavations.) Most of the coffins were made of cypress. About its inhabitant: they expected to find him in his finest clothes, but they also anticipated bad deterioration because the second burial had been in damp ground and the coffin had rusted through in two places. They would determine age, sex and race, measure the size and stature, check tissues to find the cause of death. Two forensic pathologists from the Armed Forces Institute of Pathology, Marc Micozzi and Cmdr. Glenn Wagner, would help. A biochemist would conduct tests. A specialist from the Museum of American History, Shelly Foote, stood by to try to date the clothing. John Verano, a Smithsonian postdoctoral fellow in skeletal biology, Robert Mann, Smithsonian museum specialist, and Mary Manhein, a physical anthropologist from Louisiana State University, would assist.

Bolts that pinned the casket lid in place had been removed. The plate over the glass window was gently lifted away. One by one, we steeled ourselves and silently peered in. The glass had fogged up. We could see nothing.

The doctors got a grip on the heavy lid. Voices dropped to a whisper, then ceased. I noticed a few heads turn away. With a concerted heave, the lid came off. My tape recorder picked up a gentle grating and a quiet voice: "Oh, my."

The sight shocked us all. Before us lay the rather meager remains of a human being, a jumble of blackened bones within the remains of clothing that had all turned to a primordial brown. Not very pretty. Yet, oddly, a different sort of impact quickly displaced revulsion. For we were making authentic contact with another time, another generation.

Quickly, too, the enigma fascinated us. Identify anything here? It seemed impossible. But the clothing historian was suddenly, infectiously excited. "Look at that bow tie! Beautiful! It can't be much earlier than 1857. The earlier ones were wider. And the coat opening confirms that. Later on, frock coats buttoned up higher. . . ."

The brown, strangely leathery-looking fabric of the coat was, she was sure, black wool broadcloth, discolored by iron oxide from the casket. "And see, he's wearing shoes." Doug Owsley said that in the mid-19th-century burials he'd investigated, men seldom wore shoes. These had wool uppers, leather heels and soles, and fastened with ties.

The shirt had disintegrated, but the trousers had a modern-type fly instead of the front-opening flap of earlier days. A metal button showed up green from oxidation. The heavy coat had wide lapels and fabric-covered buttons. The man wore silk knit gloves.

Smithsonian's Ubelaker (left), Owsley and Mann take mystery man's measure.

Measurements indicated that he stood about 5 feet 7. The bow tie had a circumference of 16 3/4 inches. Allowing for the shirt, that would give "John Doe" a neck size of perhaps 16. Physical size, said the forensic people, is interesting because recent research suggests that the stature of our great-great-grandfathers may not have been as short as we are often told when we visit, for example, the cramped tween decks of the USS *Constitution*. The Smithsonian has checked 28 soldiers of the War of 1812 and found their average height to be almost the same as that of today's GIs.

I noticed the armed forces pathologists selecting tiny bits of brown matter with their forceps and putting it into a clear solution in marked vials. This,

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said one, was to rehydrate the tissue so it would reveal its original cell structure under a microscope.

"How do you choose what to rehydrate?" I asked.

"I look for the remains of little organisms like this tiny snail . . . see? It would feed on soft tissue, so I take a little matter from where I found it."

I was somewhat sorry that I asked. But I was gripped by seeing the experts glean so much knowledge from so little substance. I found that I was comparing the various items being discovered from that old life with what I knew in my own life. A lapel buttonhole in the broadcloth coat was just where my own is. Had he ever worn a flower in it, as I have? The gloves—had he found them annoying, as I do, and worn them only out of social convention—and in death?

The bones: "See that lipping? That's an age indicator." One of the doctors was showing me a rim, a flange of bone at a joint. "These and osteophytes—little outgrowths—come as you get older." I could already feel my own. I gazed at John Doe's vertebrae as they were salvaged and assembled. Considering the crushed disk that I suffered years ago, my spine may well look worse.

He'd had even more tooth trouble than I. He'd lost two from abscessing, and the rest showed a lot of wear. Why? Eating grits? "Looks as though he'd been chewing rocks," someone said. The doctors spotted some caries and four gold fillings. I sympathized. I carry a veritable treasure trove in my mouth.

As we go to press, Doug Owsley reports that John Doe's identity has been narrowed down, by reference to family records, to one of three men. He was of medium build, well proportioned and bore no signs of heavy physical work. One of the next steps is to do a facial reproduction. More about his life will be disclosed by biochemistry. Dr. Noreen Tuross of the Carnegie Institution of Washington has been analyzing bone tissue to discover what antibodies it contains. An antibody will react to the disease that produced it, so by exposing the samples to syphilis, for example, or tuberculosis, she will see whether John Doe suffered from them. She will also be testing for trace metals and other elements that can give us some insight into his diet. The techniques that Dr. Tuross is using are on the cutting edge of modern science. This century-old burial provides a unique test case because it offers a relatively controlled environment. Thus, John Doe has given us an important "first."

"Don't forget," said Doug Owsley, "that the work we're doing with this man can be used to learn the significance of human remains that may be thousands of years old. So while we are answering Drew Burk's questions, we're also learning how to answer other questions dealing with the origins and prehistory of Man."

Our nameless benefactor died sometime between 1856 and 1867 at about 45 years of age. Microscopic study of paper-thin sections of long bones reveals changes in their internal structure as age increases. Also, pubic bones have surface ridges at the joints in youth, smooth out with adulthood, then, like John Doe's, begin to break down. His bones also showed signs of arthritis, including a touch of gout.

Ah, gout. My heart goes out to him.
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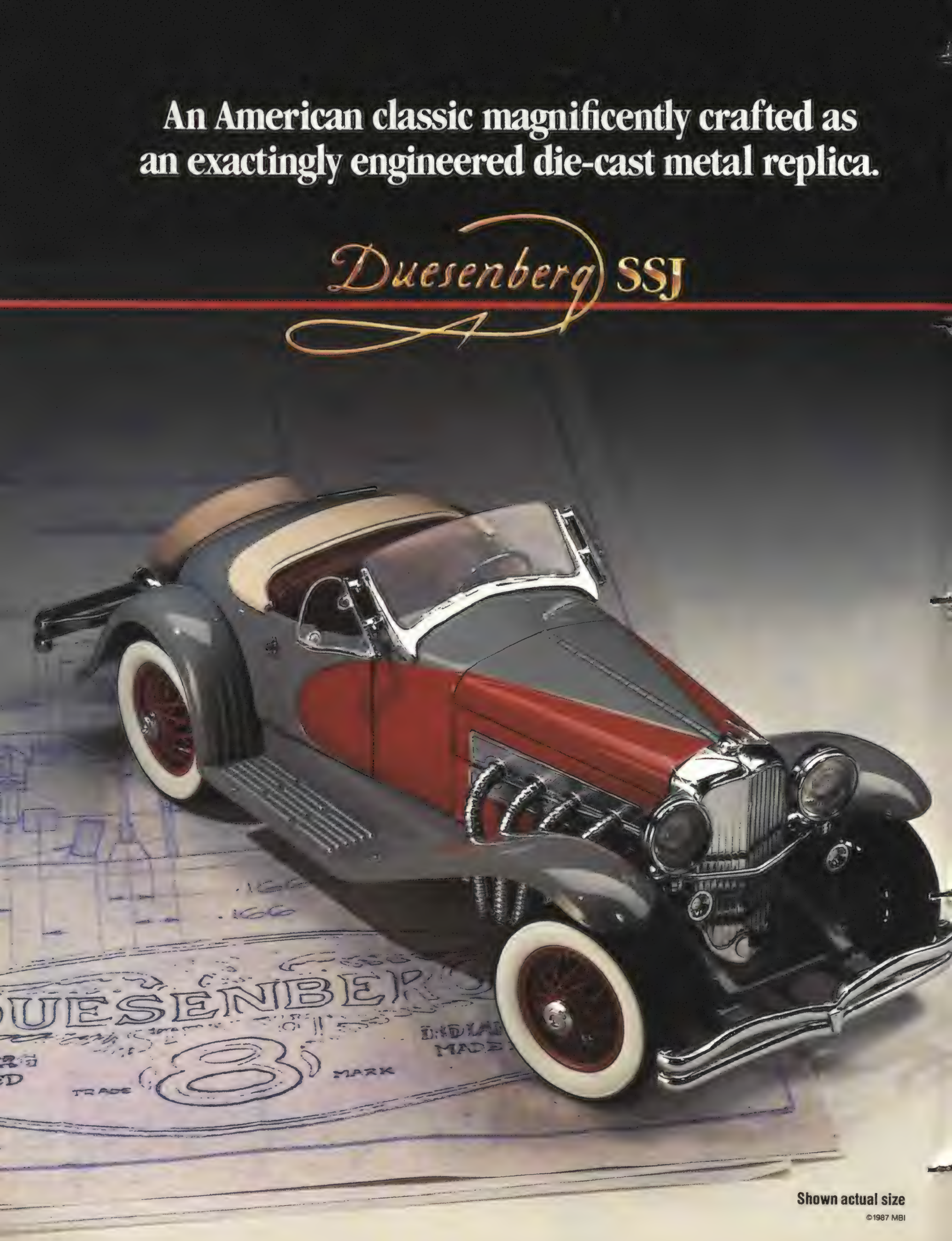

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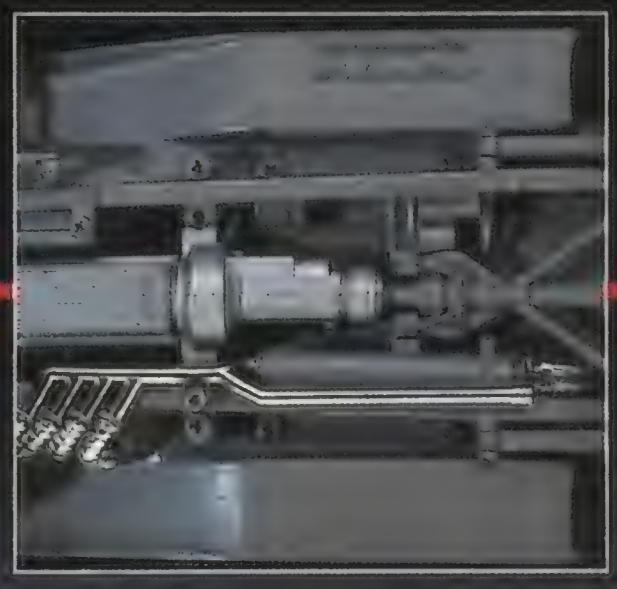

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Phenomena, comment and notes

Spruce-fir forest tops Mount Graham. Astronomers want telescopes on two peaks, conservationists disagree.

For an Arizona mountain, the Forest Service must decide between unique ecosystem and major new observatory

Sometime during August, the U.S. Forest Service is going to try cutting a baby in half, certain it will not be cheered as another Solomon. The regional forester in Albuquerque will decide the bitterly disputed future of a sky island in Arizona, a mountaintop where a taste of Canada has hung on since the last ice age. This is not the usual fight between real estate developers and preservationists, but one between scientists who see the mountain as a site of international astrophysical significance and a remarkable coalition of people who normally would not talk to each other but who all want the mountain saved as a unique biological site.

Leading the astronomers is a former submarine sailor who acquired a Greenpeace T-shirt while fighting for whales in Hawaii; leading the other side is an air-conditioning contractor who has put together an opposition in which animal-rights activists and Earth First!-ers join hands with hunters and members of the National Rifle Association.

The issue is whether to build a world-class astronomical complex atop 10,700-foot-high Mount Graham in the Coronado National Forest east of Tucson. Popping up nearly 7,000 feet from the desert near Safford, it is the northernmost limit to the range of many plants and animals native to the Sierra Madre Occidental of old Mexico to the south and the southernmost limit of many Rocky Mountain species. It is home to more than a dozen endemic insect and plant species, found nowhere else. Spotted owls live there, and peregrine falcons. A quiet subspecies of red squirrel, found only on this mountain, has been declared endangered. A minimum of 40 mountain lions live there, and so do 150 black bears.

The mountain is not untouched. At least three sacred Indian sites have been found there, one by a bulldozer. Timber has been cut on its slopes since the turn of the century, and the Forest Service has cleared both roads and firebreaks near the top. Summer homes dot the road at lower elevations and a lake draws campers and day-trippers. People come to hunt, to cut Christmas trees and firewood, to hike the trails, to ride dirt bikes. The Forest Service estimates that 200,000 people a year visit the mountain for one reason or another.

And yet, and yet. . . Being on top of Mount Graham is like being a thousand miles from civilization—or ten thousand years into the past. Here are hundreds of acres of untouched spruce-fir forest. The silence is overwhelming. Stop to catch your breath under an Engelmann spruce or a corkbark fir and you can hear your own blood thudding in your ears. I was there in early March when three feet of snow still lay on the ground. From the highway down in the desert, the mountain had looked the opposite of what I have seen in the Rockies. There is a tree line on Mount Graham, but here it is the line where trees begin partway up the slope and continue to the top. We drove up as far as we could in a four-wheel-drive truck and then switched to a treaded Sno-Cat belonging to the Arizona Game and Fish Department. For seven miles we shattered the silence up a snow-drifted logging road.

Paul Pierce, leader of the 34-group Coalition for the Preservation of Mount Graham, had arranged the visit. Tom Waddell, an Arizona wildlife manager who has studied the mountain for 22 years, was our guide. A former rodeo rider, Waddell calls the proposed complex an "astrophysical Disneyland." He took us to a "show" squirrel, one who could be depended upon to be there. We floundered down a slope and sure enough, just above where Waddell had seen a shower of cone chips dropping out of a hole in a tree, an unremarkable squirrel poked its head out for a few seconds to look us over.

Opponents do not want the fight reduced to simply squirrels versus scopes, however. They talk about the ciénagas, the unique wetlands above 10,000 feet. They talk about Apache trout and Apache goshawks. They talk about the bears being unscarred because conditions are so good they do not have to fight. Mostly they talk about a Pleistocene remnant unique in its biological mix, a treasure that could never be replaced.

The problem is that astronomers also consider the mountain unique, the University of Arizona's best chance to play a central role in the next stage of a golden age. These are boom years for astronomy. We are watching other solar systems form, finding out what galaxies

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are really like, and looking back in time closer and closer to the very beginning. At the same time, astronomers have come up with new designs that make it possible to build much bigger telescopes than was once thought feasible at prices lower than anyone dreamed. The question is where to put them. The sites have to be as good as the telescopes. They need to be far from the cities, whose light is impairing existing telescopes. The University of Arizona, already a major player in the astronomical community, is pushing hard for the Mount Graham site.

J. T. Williams, the Mount Graham project director at the university, is there on loan from the Smithsonian. He spent several years on the mountain, testing its astronomical potential, getting around on a snowmobile, and says it is so good that "We get goose pimples thinking about it. The atmospheric transparency is just extraordinary."

The plans for Mount Graham are ambitious. The lineup of proposed instruments, as of April, included:

- The Columbus binocular telescope, an 11.3-meter instrument with more than twice the light-gathering power of any existing telescope (SMITHSONIAN, June 1987).
- A 10-meter submillimeter telescope for short-wave radio work, one of the few portions of the electromagnetic spectrum that is still largely unexplored.
- The 1.8-meter Vatican telescope. The mirror was built at the University of Arizona with the latest, spin-casting technology.

Four more are in the discussion-design stage, including an array of smaller, submillimeter telescopes that would work as one huge one, now being designed by the Smithsonian Astrophysical Observatory.

John Schaefer is president of Research Corporation in Tucson, a private foundation that funds basic research in all the sciences. He was once president of the University of Arizona, but he is also a founder of both the Tucson Audubon Society and the Arizona chapter of the Nature Conservancy. He believes that the observatory will be built on Mount Graham, and that it will save the mountain. Astronomers will take better care of it than will weekend recreationists on motorcycles, he believes. And the observatory could double as a biological field station.

At the other end of the power spectrum is Ned Powell, an Arizona spokesperson of Earth First!, himself a backyard astronomer. Some say his group is responsible for an unsuccessful attempt to smash the mirror of one of the test telescopes on the mountain. Powell says simply that Earth First! is not a formal organization, that two or three people may decide to do something, and may or may not let it be known that they are members of Earth First! His group is prepared to appeal the Forest Service decision in August, but he points out that two Arizona Congressional delegates have said they will introduce legislation mandating the telescopes.

Walking on the snow under moss-draped trees, it was hard to imagine telescope domes, engineering shops, dormitories, fuel tanks and all the rest. So the next day I drove down to Kitt Peak to see what an astronomical complex looks like. From the gallery of the 4-meter telescope there, the mountaintop looked like some kind of military installation, paved roads threading telescope domes, brick buildings, parking lots for heavy trucks, microwave and radio towers. Inside the visitor center are some pottery vessels found in a crevice on the mountain in 1960. A legend said they may have been an offering to 'I'itoi, the being the Papago people know as Elder Brother or simply Nature. The people's gifts restored the balance of nature for having taken wild foods.

The Forest Service originally recommended that the university be allowed to put five telescopes on one site, High Peak. Last August the university announced that they need a minimum of seven telescopes on two sites, High and Emerald peaks, to make the project economically feasible. This in turn required new studies of the potential impact on the now officially endangered Mount Graham red squirrel. The U.S. Fish and Wildlife Service was to finish that in May. Three months after that the Forest Service will decide.

The time for public comment, including mine, is over. The time for a disinterested panel of astronomers to determine what are in fact the best sites left in the United States is past. The situation is now analogous to a nonjury trial: arguments have ended and the judge—the regional forester—has retired to chambers to reach a decision. Whichever way he decides, I will feel an acute sense of loss.

John P. Wiley jr.

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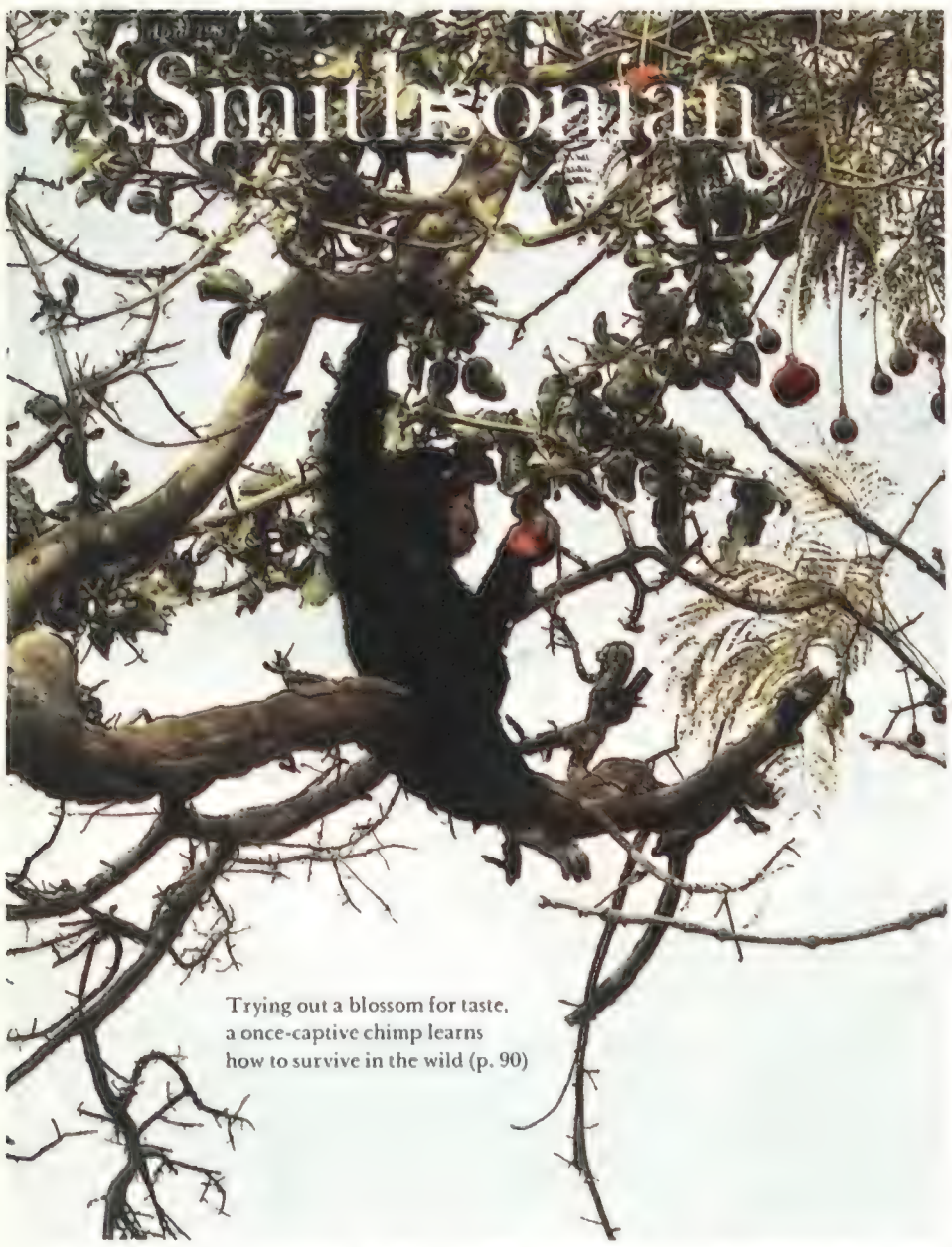
Article and photographs by Janis Carter

Freed from keepers and cages, chimps come of age on Baboon Island

In a sequel to her 1981 story, the author describes how Lucy, Dash and the others came to grips with a wild, unfamiliar world



Trying out a blossom for taste, a once-captive chimp learns how to survive in the wild (p. 90)

Only 5 years old when he appeared on SMITHSONIAN's cover in 1981, Dash was beginning his survival course.

The heat and humidity weighed down on me as I followed the chimps walking single file along the well-worn path to a favorite resting place. When we reached the clearing, I saw Dash standing there. Even though he stood with his back to me, I knew I was in trouble.

His body began to sway ever so slowly, his skin visible under bristling hair. When he pivoted to face me, his lips were tightly pursed and his hair stood on end, making him look larger and even more intimidating. The other chimps screamed and scattered, and I was left standing alone. Frozen in place, I waited to see what he would do.

Dash stamped his feet and slapped the palms of his hands against the ground; then he leapt into the air and lunged toward me. At nearly 100 pounds he was almost as big as I was and many times more powerful. I pushed an empty burlap food bag in front of me, hoping he would seize it. He grabbed both the sack and the leg of my pants as he whirled past, jerking me to the ground and dragging me through the bushes until my body caught against a tree and he lost his grip.

While Dash worked himself up for another attack, I crawled under the thick brush along the river's edge, then ran quickly to the cage that was my home. Not until I reached safety did I feel the pain of my bruised skin and torn flesh. I was fully aware that Dash's attack was only a warning, and I felt certain that it would be my last. Dash had become the dominant creature on Baboon Island.

Ironically, this event marked a major milestone in my ten-year effort to return a small group of captive chimps to a wild state.

My involvement with these intelligent apes began when I was a graduate student at the University of Oklahoma, working on a project that used the American Sign Language to communicate with chimpanzees. There I developed a close relationship with a chimp named Lucy, who had a vocabulary of 120 symbols and could sign sentences with humans.

Lucy grew up in the home of psychologists Maury

By the time Dash was 10, he could easily threaten other chimps with his size and fully developed canines. He constantly challenged the group members until he became the leader, dominating all on Baboon Island.

Lucy (right), Dash (center) and Geza welcome author as her boat approaches the pier at Baboon Island.

and Jane Temerlin, who raised her as if she were a daughter. Lucy led a pampered life, fixing coffee and tea, perusing picture magazines and browsing at will through a well-stocked refrigerator. When Lucy was nearly 10 years old the Temerlins found her a roommate, Marianne, a 3½-year-old chimp born and reared at the Yerkes Regional Primate Research Center in Atlanta. Lucy's first relationship with one of her own species proved successful.

In their exhaustive search for alternatives to a lifetime of captivity for Lucy, the Temerlins learned of a project in West Africa. It was run by a young woman, Stella Brewer, and her father, Eddie Brewer, who was the director of wildlife conservation in The Gambia. When chimps were caught illegally and confiscated by various government officials, they were turned over to the Brewers, who rehabilitated them for subsequent release in the wild. In marked contrast to Lucy, the Brewers' chimps were young and had not been raised as humans.

We all knew that Lucy did not have the skills necessary for survival—skills that require years of observation and practice, even by chimpanzees born in the wild. Most experts doubted that any adult, human-raised chimp could be rehabilitated. Lucy, Marianne, the Temerlin family and I flew to Africa filled with optimism, but realistic about our chances for success.

When I arrived in The Gambia in September 1977, I had no idea that I would spend the next decade teaching chimpanzees how to survive. I planned to be gone for only a few weeks, but it soon became clear that Lucy and Marianne were not equipped to be left on their own. The three of us got sick within days of the Temerlins' departure and I found myself isolated in a strange, uncomfortable place. The highlight of my day was marking an *X* on the calendar, each one closer to my departure date. When that day finally came, I couldn't leave; Lucy looked worse than I felt.

Lucy needed help to survive

At the end of three months I knew there wasn't the slightest hope that Lucy could survive without me; she was lethargic and dreadfully thin. After six months she showed few signs of adjustment. By the end of our first year, it was clear that I had begun a new life.

Looking back I realize that Lucy, Marianne and I were completely unprepared for our new home. The contents of my suitcase included Lucy's mirror, dried fruit and nuts for her, film, a couple of books, some clothes, a language course in Chinese (that I never looked at) and a flute. I had no equipment other than a camera; I wasn't even much of a camper. When I moved into an eight-foot-square tree house in the Abuko Nature Reserve, I used candles for weeks before

I had the nerve to ask someone how to light a kerosene lamp. Even so, I was better equipped than Lucy.

Soon other chimps began to trickle in—younger, wild-caught chimps that had been seized by the government. The first was a young male caught in Guinea and sold as a pet in The Gambia. I named him Dash. Lily, a former pet from Zaire, and Lakey, a female captured in Guinea, followed a few months later. In early 1979, Karen, Geza, Marti and Kit, part of a group illegally exported from Sierra Leone and confiscated in Holland, were sent to us. All were victims of the commercial trade in chimps, a brutal business that captures babies and sells them to laboratory research projects, zoos and circuses, and to individuals as pets.

When capturing young chimps, hunters usually kill the mother and sometimes other members of the group. The emotional trauma of separation from the mother is then often compounded by mistreatment. Frequently the chimps' hands and feet are bound and they are kept in small carrying cages. With little attention to their emotional or nutritional needs, the orphans often die. Statistics suggest that up to ten chimps die for each one reaching its destination alive.

The orphans who arrived at Abuko needed constant physical contact, clinging to one another or to me. When Dash was young he had nightmares, and as I held him his sharp fingernails sank into my flesh; any quick movement caused him to bite. I calmed him by making smacking sounds with my lips and grooming him as his own mother would have done. I recall taking a walk with Dash shortly after he arrived, when we encountered a butterfly collector carrying a large net. Dash screamed hysterically and produced a stream of diarrhea. He hid under my shirt, inconsolable. I later learned that hunters often net chimp babies after shooting the mothers. (Even now, years after their capture, the wild-born chimps in my group go into screaming fits at the sound of a gunshot.)

Eighteen months after coming to Abuko, I moved the chimps 200 miles east to uninhabited Baboon Island in the River Gambia National Park. We shared the island with baboons, vervet monkeys, red colobus monkeys, hippos, spitting cobras, vipers, hyenas and a variety of antelope, cats and birds. The Brewers' chimps were relocated on a neighboring island. Although Baboon Island was ideal for chimps, my living conditions were primitive. We had no electricity or running water; heat, mosquitoes and tsetse flies we did have.

I lived in a tent enclosed in a wire cage that provided a refuge for me and my possessions away from the chimps' inquisitive hands. Undaunted, they would break off branches and modify them to fit through the wire and fish for anything that wasn't nailed down.

For the next two years, as I described in my SMITHSONIAN article in April 1981, I lived more as a chimpanzee than as a human. Most of the chimps had some experience in the wild, but Lucy and Marianne had none. Learning as I went along, I taught them how to build sleeping platforms high in the trees. By gnawing on green figs and live ants, I showed them how to forage for wild foods. I had long since stopped counting the days until my departure—getting through one day was tough enough.

During the early 1980s, the chimps progressed, slowly gaining the confidence to move away from the camp and forage on their own. But the adaptation was most

Janis Carter continues to follow the progress of her 33 free-living chimps on Baboon Island and leads education programs aimed at safeguarding their future.

Wolfgang Bayer

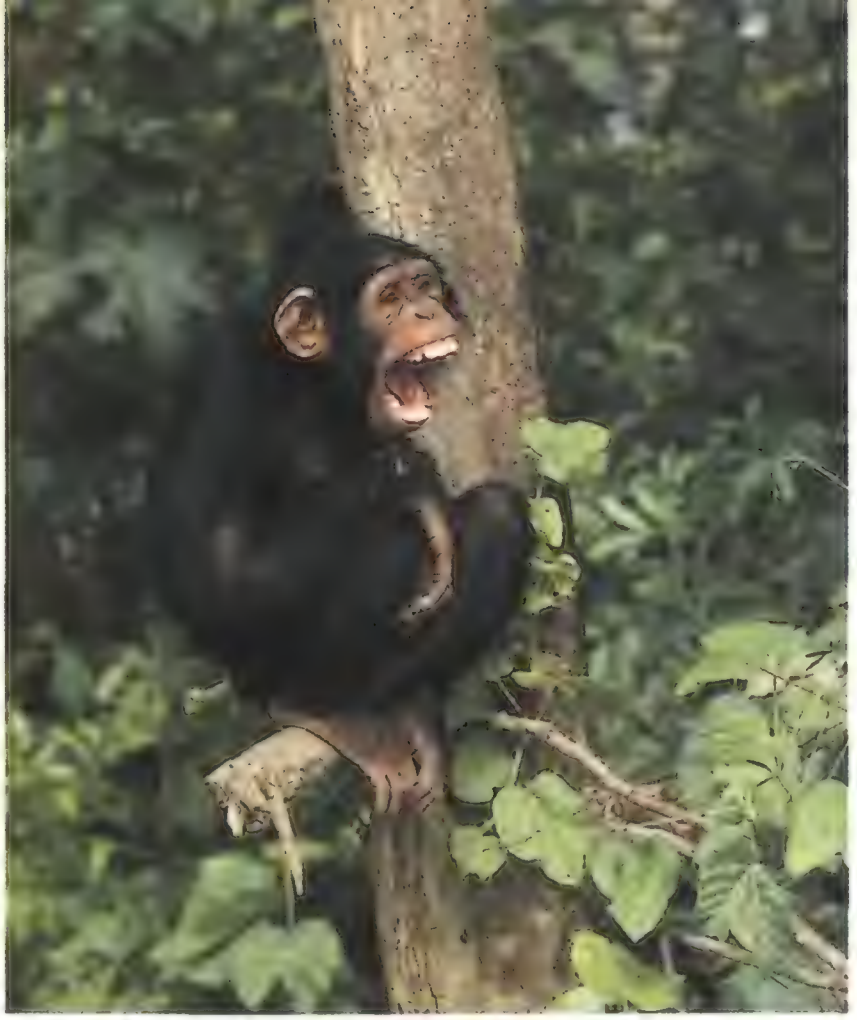
Janis offers one of the younger Brewer chimps supplemental food on visit to a neighboring island.

difficult for Lucy. Each day I spent hours teaching her, responding to her needs and she responding to mine, as though she were another human being. A turning point for Lucy took place when she adopted Marti shortly after I brought him up from Abuko. In an effort to strengthen her relationships with the rest of the group, I gradually withdrew my emotional and physical support.

My withdrawal from Lucy was difficult for both of us. There was an overlap of our lives that I could not separate easily. Back in Oklahoma, Lucy and I had begun our life together as equals. When I first met her I cleaned her cage; gradually I got to know her and became her friend. When we departed for Africa, we both left behind our loved ones, our material possessions, and a comfortable lifestyle. We suffered through many of the same depressions, illnesses and deprivations during our transition. I couldn't tell where my life stopped and hers began. The only constancy during this time was our relationship, each of us acting as a crutch when the other needed it.

Beginning in 1983, my life and that of the chimps began to change after a series of dramatic events. Lucy nearly died of a hookworm infestation and we saved her only by having chimp blood hand-carried to The Gambia from New York University for a series of transfusions. Tragically, Lucy's adopted son, Marti, died of a rare allergic reaction to a parasite lodged in his stomach lining.

In spite of the deaths of Marti and a few others in the Brewer group, the total population of Baboon Island increased through births and new introductions. With the Brewers' chimps and mine, three islands now supported four social groups of chimps. A younger group was being held in Abuko awaiting release. Although I had traveled widely in West Africa to find a larger reserve that could become a home for all the chimps, I had been unsuccessful. Human encroachment has forced wild chimps into isolated pockets throughout Africa; some estimates indicate their population is down to 100,000 or less. To make better use of space, we decided to move two of the Brewer groups to Baboon Island.



Kit is not threatening or screaming at anyone from perch in a tree—just opening her mouth in a big yawn.

The other groups would be gradually integrated with mine, a process that would take time and could prove dangerous to the chimps and to me. My chimps were growing bigger and the group hierarchy was becoming more entrenched. Field reports on wild chimp communities indicated that stranger groups, particularly adult males, are often hostile and aggressive at a first meeting, sometimes with fatal results.

In order to manage the integration process, we had to build several large cages. With the cage wire between them, the larger, more aggressive chimps would be separated from the newcomers until they became acquainted. They wouldn't immediately compete for dominance. Subsequently the cages would be used for supplemental feeding and for future emergency or health monitoring. It took two long years, from 1983 to 1985, to build the cages. In the United States, this task would have been relatively simple, but in The Gambia it proved nearly impossible. Construction materials, never plentiful, had all but disappeared with the country's deteriorating economic conditions.

While the cages were being constructed, my chimps grew more aggressive toward the people who delivered

Marti, baobab in hand, passes food by mouth to Kit, common practice among chimps who are close friends.

Dash sounds a pant-hoot, a signal among chimps that starts low and builds to bloodcurdling scream.

my mail and supplies—the few humans I had contact with. The arrival of any boat created a high level of excitement and anxiety. Aspiring to the dominant role, Dash challenged everyone.

My bond with Dash was special. He had been the first young chimp to join Marianne, Lucy and me. Only 3 years old, he was too small to be housed with them, so he lived with me in my two-story tree house at Abuko. One night during a thunderstorm, I peered downstairs to see Dash, wet and whimpering, clinging to a ladder, the only available dry space. From the moment I reached out and pulled him up, we were inseparable. Dash accompanied me everywhere, riding clutched to my body. I grew so accustomed to his presence that I forgot how unusual it might seem to others.

When Dash developed a respiratory infection, I took him to a local clinic. We took our place at the end of a long line of women with babies tied to their backs. Dash, inconspicuously tied to my stomach and swaddled in a sweatshirt, was feverish and dozed off. When it was our turn, the weary nurse pulled back the hood of Dash's shirt to examine him. The screams were earsplitting. I had forgotten to tell her that I was bringing her a chimpanzee infant, not a human.

For the first several years on the island, Lucy and Marianne jointly ruled the group, but as Dash grew he challenged their position, gradually dominating Marianne in Lucy's absence and vice versa. If Lucy wanted to, she could still push Dash aside, but he became the center of attention.

When the integration cages were finally finished, it was time for me to move off the island. In preparing to leave I realized I had saved every piece of string, plastic and wire, anything that could be used for some unforeseen emergency. Several pairs of worn boots hung from the cage ceiling; one shoe hung alone—a hyena had eaten the mate. Few of my possessions had weathered the harsh, steamy climate or the hungry rats. My reliable tent sagged in the middle, its rat holes stuffed with old socks. With no money to replace it, I would have to use it in my new camp across the river on the mainland. Since Lucy, always sensitive to my movements, could tell whenever I was going to leave her, I moved my things off the island gradually.

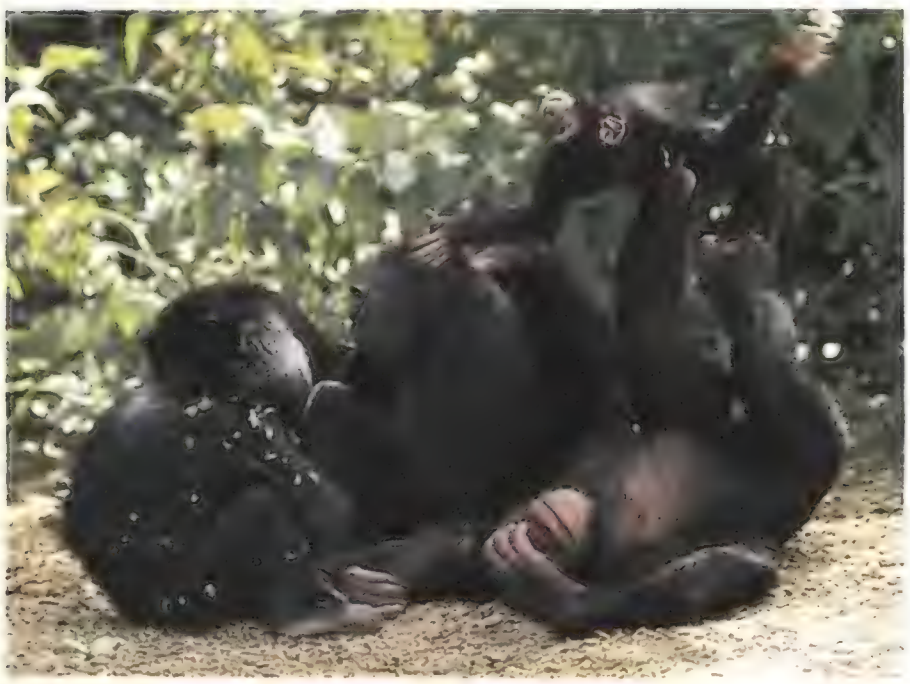
On my last evening with the chimps we stretched out on the pier, lolling in the warmth of the setting sun. Even Dash was quiet at this time of day and sat next to me with his stubby leg across my lap. Sighing deeply, he gestured at me to groom him. I silently said goodbye to each of them as they meandered off to nest.

We began the removal of my camp and started the integration during the rainy season of 1985. Before anyone could work on the island, I had to trap the older, more dangerous chimps in the new cage. The African assistants, René Bonang and Bruno Boubane, who had worked with the Brewer chimps for ten years, and Samba Boiro, who had only just begun working with me, would need to come onto the island to help. I would rely on Bruno during the first meeting of the younger chimps. Once that was complete, we could introduce Lucy, Dash and Marianne one at a time to reduce the level of aggression. At least that was the plan.

The day we trapped the bigger chimps, Bruno and I secured the boat to the door of the access cage, which extended out over the river. I called for Dash, Lucy and Marianne as I spread food on the floor of the

Lucy (left) greets Menchen and baby Menky with soft pants and a prone wrist, signs of gentle interaction.

Marianne finishes baobab near Wury, who at 11 months is never farther than arm's reach from her mother.



Playfully tossing 2-year-old Menky with his feet, Dash keeps a firm grip on one leg to prevent a fall.

cages. I knew that we would have only one chance to trap them; we wouldn't be able to fool them twice.

I was dismayed to see all eight of my chimps run into the cage with an angry troop of baboons following close behind. Bruno closed the trapdoor entrance and Dash screamed an alarm call. I pulled out a carton of yogurt I had with me and quickly filled his mouth.

Lakey realized she was trapped and jumped on the wire of the cage, trying to escape. Fearful that Lakey might injure herself, Bruno opened the trapdoor and she quickly slipped out. I moved Karen and Kit to the smaller compartment and then released them, leaving Lucy, Marianne, Dash, Geza and Lily in the larger cage. It was cramped quarters for such a rowdy crowd, and whenever I tried to leave, they screamed and pounded on the trapdoor.

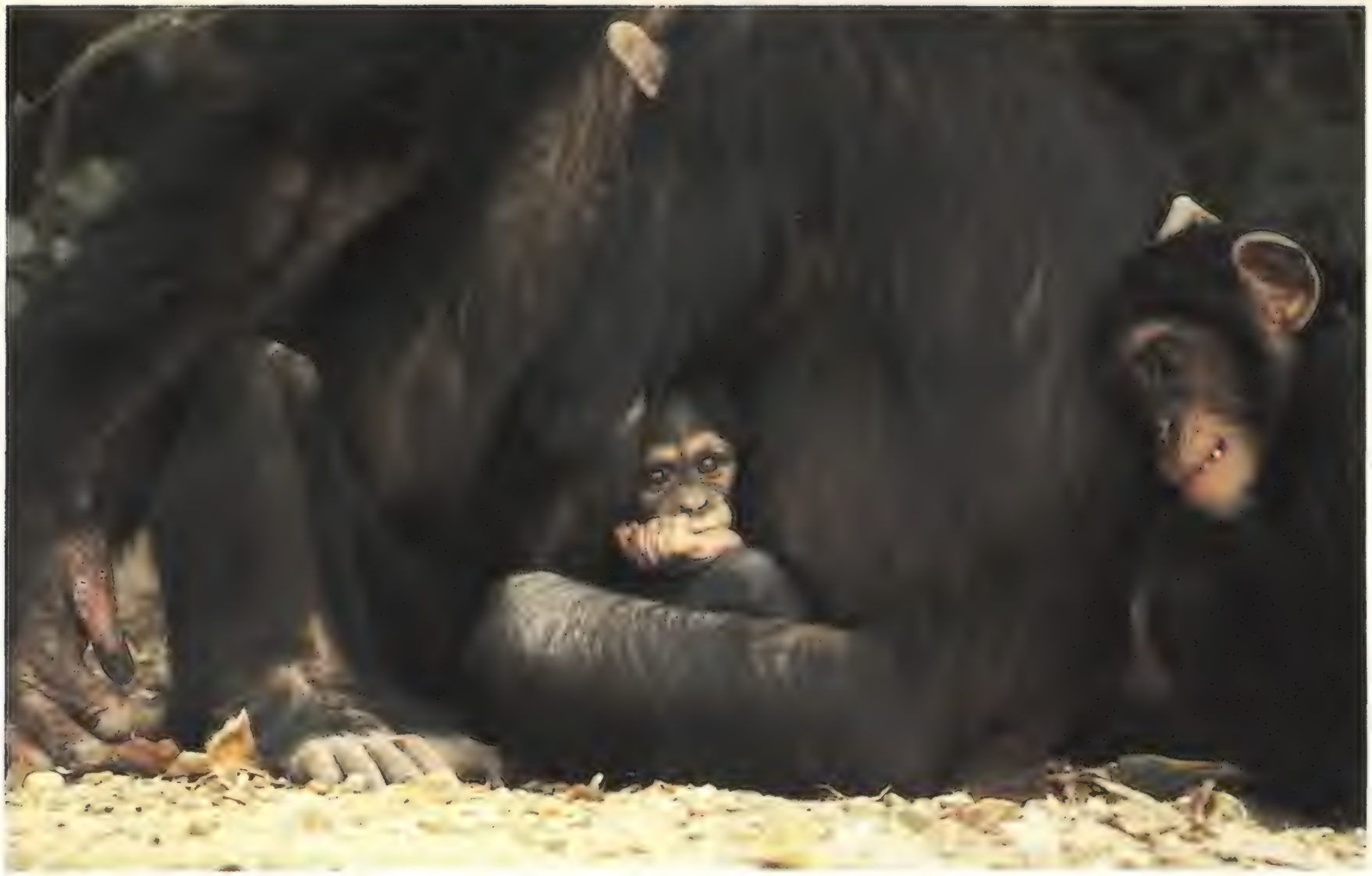
Ultimately the chimps handled their confinement fairly well. Eating became the highlight of their day. Marianne seemed especially happy as she gathered armfuls of baobab fruit off the floor, climbed into one of the chain link hammocks, and groaned in satisfaction while gorging herself. But wherever I worked on the island, I could hear Dash hollering and banging on the door. Though I had been told that the cage was escapeproof, I was worried he would find a weak spot.

With my larger chimps secure in the cage, we started introducing the Brewers' younger chimps to the smaller members of my group. I waited on the island with Karen, Kit and Lakey as the boat approached with the first of the new group: Boy, Emma, Zwockel, Jumbo and Katie. Several of them were perched cockily on the side of the boat, swaying and pant-hooting. As the boat hit the riverbank and Bruno and the five chimp passengers leapt out, an instant tangle of bodies formed amid squeals of excitement. The chimps embraced each other. Lakey nudged her bottom against the others' and greeted everyone with soft pants and prone wrists. Karen, who had a genital swelling, was quite receptive to the attention given her by Jumbo, a young male. Kit silently greeted each of the new arrivals from a distance of about one inch, staring into each newcomer's eyes before moving on to the next.

"I fell backward with Lakey on top of me"

Then Lakey's play bounces became a bit too boisterous, and she plowed into Boy. Even with both arms around her chest, pulling as hard as I could, I was unable to separate them. Bruno began to pull Boy from the other direction, and I fell backward with Lakey on top of me. Bruno and I managed to keep the two apart until twilight, when all the chimps left to nest.

Over the next few days there were a number of troubling incidents: little Emma turned up with wounds on her hands and feet; Lily bit Bruno on the



Karen wraps her body protectively around her baby, Moise, as an exhausted Menky rests against her back (Dash on left). Chimp babies are wholly dependent on their mothers and not weaned until age 5 or 6.

hand when he tried to stop her from attacking Killi, another of the newcomers. Eventually things settled down and the introduced chimps gradually moved to the opposite end of the island.

To introduce the adults, we would release my group to roam free, and put the Brewers' large chimps in the cage for a while. As I expected, my chimps rushed to my old campsite as soon as they were released. Dash ambled into the clearing and stopped aghast, frozen in midstride. Marianne sat down on the concrete slab and swiveled her head, looking for the camp that was no longer there. Geza was busy sniffing the recently turned earth, and Lucy sat alone showing no emotion. I left them as it grew dark.

The following day we went ahead with moving the adults of the Brewer group. They included Pooh, a large, fully grown male; four females, Melanie, Jenny, Nini and Menchen, and their four infants. Just in case serious fighting broke out among the adults at my end of the island, René and Bruno released three of the females and their offspring on the opposite end. Menchen was fearless, so she was chosen along with her baby, Menky, to accompany Pooh. They were trapped, anesthetized and moved to the integration cage just after dusk, nesting time for my chimps.

But mine seemed to know that something exciting was in the air, and as I watched from the boat, they all assembled near the introduction cage. Dash grimaced with fear, his eyes shifting nervously back and forth between the enclosure and me. Each time the caged Pooh groaned like a sleeping lion, Dash would whimper and extend his outstretched hand toward me for comforting. He entwined his fingers around the bars of the cage, rocking back and forth, crying, grinning and pleading for reassurance. I was afraid to put myself in a physically vulnerable position, but finally I ventured onto the island to console him. His fear of Pooh surpassed his need to dominate, and we sat huddled together against the cage. I touched and groomed the still-unconscious Pooh through the wire, hoping to convince Dash that there was no danger. Soon his exaggerated fear-grins softened to appreciative smiles. Night had fallen before Dash left my side to go to nest.

I was apprehensive during my boat ride back to the mainland. Dash was not as big or as old as Pooh, and had only recently gained dominance over Marianne and Lucy. I worried that by forcing this introduction, I was setting him up for a fall—or worse. Next day, Pooh remained in the cage, still groggy from anesthesia. Dash positioned himself next to the cage and tried to touch Pooh as I had done the night before.

As Pooh regained consciousness, he began to play and to groom Dash through the wire. If another chimp approached, Dash screamed in alarm, fiercely barring

Though Janis discarded termite-damaged chair from her tent, Marianne finds it good enough to sit on.

any advance toward Pooh, who responded by screaming himself. The two stood facing each other, screeching as loudly as they could, mouths pressed together against the wire. Their calls gradually moderated to soft pants as they settled into a chummy grooming session and my worst fears subsided.

We released Pooh and Menchen on the third day. As hoped, Menchen and her baby served as a valuable distraction. An entourage of females from my group surrounded them, and they all sat on a fallen jallo tree, busily inspecting and grooming each other. Marianne and Dash were the only ones to stay by the open door of the cage waiting for Pooh, who, given the welcoming committee, seemed reluctant to leave.

When Pooh finally emerged, Dash stood upright, his chest pushed forward. Pooh walked right past him, barely acknowledging his presence. For a time the two paced back and forth. Then Pooh faced Dash and with a loud squeal they fell into an embrace. Marianne grimaced and presented her swelling to Pooh, who turned to Dash for support. With Dash's arm about his neck, Pooh moved to the tree to join the females. As the males climbed up, Pooh deferred to Dash, as one by one each new female greeted him. Dash patted Pooh on the back and scrotum. Relieved and emotionally exhausted, Bruno and I congratulated each other on what seemed a near miracle.

But Pooh had yet to meet Lucy, who did not enjoy the same confidence with chimps that she did with people. Pooh was far larger than any chimp I had ever brought onto the island and I was worried. Their first encounter took place at my old campsite. Pooh stopped abruptly when he saw Lucy, who was sitting, casually eating an orange. She remained still and gave Pooh a warning "waa" bark. But she showed no outward signs of fear or submissive behavior. There was little we could do and I was concerned that our presence might complicate the situation, so we left.

When I returned the following day, all the chimps were calm. Menchen and her baby were still the center of attention for the females, and Dash was still mesmerized by Pooh. Oddly, Pooh disappeared the following day and was not seen until two weeks later, on the other side of the island, where his original harem had been released. Menchen remained with my group of chimps where she and her baby, Menky, provided them with a wealth of early maternal behavior that many of them, particularly Lucy and Marianne, had missed.

The two adult groups stayed apart on opposite ends of the island. We monitored their movements at specific feeding sites every two days. Although the membership of the groups never changed, individual animals were often absent on their scheduled feeding days. I grew anxious when we did not see Marianne and her adopted son Geza on three consecutive visits, but on the sixth day they both appeared with Pooh's group and Marianne displayed full genital swelling, indicating ovulation.

Female chimpanzees in the wild have been reported to transfer, either permanently or temporarily, from their natal group to neighboring groups of chimpan-

When Lily found a bar of soap, she lathered up, mimicking Janis, who bathed on the pier every evening.

zees. These migrations, particularly those of short duration, are usually associated with the female's estrous cycle. Transferring females are often accompanied by their offspring, so Geza was along for the ride.

Their first trip lasted only a few days. The adult females were periodically hostile to Marianne and Geza, but Pooh defended the visitors from even the mildest attack. He struck up a very playful relationship with Geza and was observed mating with Marianne on numerous occasions. It was thrilling for me to see Marianne and Geza coping so well.

Marianne has a baby

After three visits, Marianne returned to our group, where she exhibited signs of pregnancy. The average chimpanzee gestation period is 229 days; for me the time dragged on forever. Then one morning, Marianne hobbled to the feeding cage cradling against her chest a tiny, brown body with a big, hairy head. I named the female baby Wury, a Fulani word meaning life. Wury's birth was the most exciting event I had experienced with the chimps. The stress and hardships of nearly a decade faded at the sight of Marianne with a baby. Unfortunately my brief period of peace was short-lived.

A respiratory infection, often fatal to chimpanzees, broke out in the group. Dash, Marianne and Wury developed high fevers and their breathing became raspy. One day, Marianne entered the feeding cage where I had been waiting with supplementary food. Exhausted, she fell asleep as she swallowed her last bite, leaving little Wury crying on the floor. I wasn't sure if she ignored Wury's needs because of her illness, or just from ignorance.

Marianne was an important case study for rehabilitation efforts. She was born at Yerkes, separated from her mother and reared in the nursery with other young chimps. Although she had regular contact with both humans and apes, she did not experience species-specific mothering, denying her the rearing model so essential to her own role as a mother.

We had seen Wury nursing but Marianne did not always respond to her requests. To provide a model, I wore a chimp doll tied to my chest. When Wury cried and stretched her spindly arms toward Marianne's nipple, I would scoot my chimp into position and encourage Marianne to do the same. As she grew stronger she became more attentive, cradling the baby in her arms and often moving her into a suckling position before she cried. Wury grew stronger as well, her little fists clutching tightly to Marianne's hair as her mother resumed walking on all fours and left the cage to join the group. Marianne's successful pregnancy and appropriate maternal care show a degree of normalcy she may not have achieved in a captive environment.

Geza doesn't like to get muddy when he drinks from river at low tide, so he came up with a new technique.

All of the chimps were curious about the new baby; Dash was the most insistent. Standing near Marianne, he would bounce up and down, swinging his mouth from side to side like a doting human father talking to his infant. I never saw Lucy touch the newborn baby, but I often saw her make the sign for baby.

Though greatly handicapped by her mature age at the time of release, Lucy too was making tremendous strides. In 1986, six months after I moved off the island, I went back to visit her. We had seen each other regularly, but at a distance. She greeted me with a big open-mouthed kiss and sat me down. Lucy groomed me intensively for several moments, thoroughly inspecting my face and hair. Panting softly she suddenly encircled me with her long arms and nestled her head against my chest. I had brought with me some objects from her past: a mirror, a baby doll, a hat, books, paper and pens. I felt she was comfortable enough in her new life that she wouldn't suffer from the memories these objects might evoke. After our short visit Lucy just walked away, leaving behind on the ground the things that had once played a major role in her life.

Even Lucy's health had stabilized. Her struggle against the hookworm parasite appeared to have ended and she put on weight and resumed her regular estrous cycle. With her cycling came a renewed interest in mating. She was jealous of Dash's amorous atten-

In the days after Brewer chimps were introduced to Baboon Island group, many confrontations took place. Here, Pooh (at left) retreats from a skirmish, hoping to enlist a highly excited Dash (right) as an ally.

tions toward other mature females and often intervened before copulation occurred. Although Lucy pulled away nervously when Dash tried to mount her, she slowly allowed him to inspect her swelling. She spent more time with Marianne and Wury, playing chase and cuddling the younger chimps. I was certain that the final obstacle to Lucy's development as a wild chimp was about to crumble.

Watching Lucy interact with her group, I found it difficult to distinguish her behavior from that of the others. She seemed at peace with her role, just as I was struggling to find my place with humans again. I planned my first nonworking trip since coming to Africa and when I returned, Lucy, Marianne and I would celebrate our ten years there.

During my absence, René, Bruno and Boiro checked the chimps and took notes regularly. Just days after my departure, Pooh and his group arrived at my old campsite, where they encountered Lucy. She had not seen Pooh since the introduction two years before, and now when he tried to approach her for mating, she vehemently refused him. Lucy joined the visiting females in grooming sessions and appeared to be developing friendships. When Pooh picked up the log Lucy always sat on and threw it into the bushes, Lucy retrieved it and dragged it back into place, angrily shaking her fists and screaming at Pooh. The tension continued until Pooh left two weeks later. In a final display he threw the log into the river. Lucy responded with screams and shouts, shaking her fists and running bipedal, asking the others to help her. Followed by Lakey and Geza, Pooh left for the other side of the island. Just two days later, Lucy disappeared.

I was gone for a month and when I returned I was alarmed to hear of Lucy's absence. Yet it was not unusual for individuals to be away for long periods. Lucy was in perfect health and at peak swelling in her estrous cycle, a possible explanation for her move away. Considering her new friendships, I convinced myself there was nothing to be worried about. In fact I felt a sense of excitement at Lucy's ever-increasing progress.

Still I began to search for her, circling the island, calling out to her from the boat. I saw all the other members of my group, and to my surprise Karen showed up one morning with a large, male baby I named Moise. But when Lucy did not appear after another two weeks, I had to face the possibility that she was not alive.

We decided to search the island on foot. René kept Pooh's group occupied with food bribes at the northern end, and I did the same with my group. Boiro and Bruno joined villagers from the mainland who combed swamps and thick bush. They found nothing; the only place left to search was my old campsite.

All of us met near the integration cage early the next morning. Bruno and Boiro waited offshore as I went onto the island. My hands were shaking when I called

When Pooh tried to get too close to Karen and her baby (right), she attacked him and bloodied his face. It was not a life-threatening incident, and he quickly calmed down when given sympathy by the others.

to Dash and the others to enter the cage with me. Nearly two years had passed since the chimps had been locked in the cage for any length of time, and now they were even bigger and more aggressive. I was anxious. After shutting the door, I radioed the others that it was safe to go onto the island. But soon Dash began to quarrel and fight with the other chimps. When I called Bruno and Boiro to tell them that we had to get off the island, they told me they had found something. The minutes it took them to return to the boat and push off dragged by like hours. I released the chimps from the cage, then took my boat and met Bruno and Boiro in midriver.

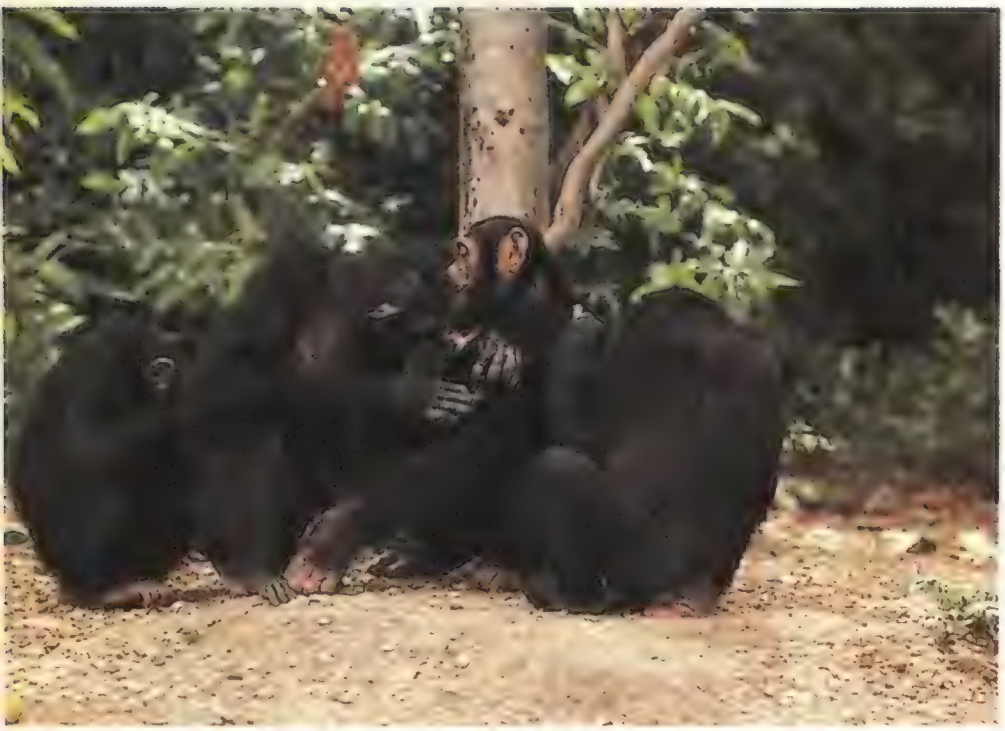
Stopping my boat alongside theirs, I waited in silence. It was Boiro who finally stuttered in English that Lucy was dead. We floated quietly for some time, the blistering sun on our backs. I wanted to deny the finality of Boiro's words. Reluctantly they showed me a skull. The serenity of Lucy's face seemed to radiate from this bony frame.

We buried Lucy next to Marti beneath a sapling of her favorite food tree. Bruno and I sat side by side while I forced my clenched fist open, allowing the first handful of dirt to fall on her.

The cause of her death may never be known. At age 22, Lucy was in her prime and in excellent physical condition. If she had caught a fast-acting virus she would have had the stamina to get to the feeding cage, where she knew she could get help. No baboons were observed in the area in the five days surrounding her disappearance, so a fight seems unlikely. A fall from a tree during a storm was another possibility, but close inspection of her skull revealed nothing. Snakebite also seems improbable considering her cautious behavior and years of experience on the island.

Bruno and Boiro found her remains near my old campsite. Except for her hands and feet, the entire skeleton was there. Scavengers might have consumed the small bones, but the hair and skin were also missing. We can only speculate that Lucy was killed—probably shot—and skinned. Because of her confidence with humans, she was always the first to confront newcomers to the island. She might have surprised an armed intruder, with fatal consequences.

Lucy's entire life was dominated by challenges and difficulties, mostly man-made. Born in a roadside zoo in the United States, she was raised like a human child and loved by human parents; she became a key player in a human-language project and was probably killed by humans. Yet in a way, Lucy's life ended in dignity, at home in the natural world. In her first decade, Lucy, along with other chimps, shattered claims that only humans were capable of language, setting off a debate that continues today. She spent the second ten years of her life struggling to regain an identity of her own. Her successful transition set a precedent that now of-



Appearing content with her new life in the wild, Lucy (second from left) engages in a grooming session.

fers an option of freedom for countless other chimpanzees living in captivity. She also liberated us from the deeply ingrained prejudice by which humans set themselves apart from other species, a distinction that falsely justifies the suffering that we inflict on them.

To those of us who knew her, Lucy was an extraordinary creature, sensitive, caring and gentle. All the other chimps had tremendously difficult adjustments to make on Baboon Island, and I did too, but Lucy had the furthest to go. It is not hard for me to analyze my feelings about the other chimps and articulate my relationships with them. With Dash my relationship was that of mother to son. I raised him from the age of 3 to maturity. With Lucy it was not so simple. For 12 years she was the thread that joined my days, weeks, months and years. It was her perseverance as well as her problems of adjustment that kept me in Africa for so long. As a scientific matter, her reluctant and often painful transition from the life of a human child to that of a mature female chimpanzee spanned the extremes of the rehabilitation process. Her first stressful years gave way to positive signs of improvement; she was soon assimilated into the chimpanzee family. Once she had become a part of the social group, Lucy flourished, gradually eliminating one obstacle after another. Though elated by her progress, it was a lonely time for me. At the time of her death Lucy's future as a chimp in the wild seemed a long, open road. She has left me with a belief strong enough to give my life unwavering direction.

My life with the chimps has changed dramatically since I moved off Baboon Island. Today, my original family of chimps no longer exists. Lucy and Marti are gone, Marianne and Karen are now mothers, and Menchen and Menky have permanently joined my group. Even when the tide is high in the late afternoon I remain in the boat, moored just off the riverbank. The few feet of water between us has distanced us in significant ways. Where I once shared every part of their lives, I am now an observer. I watch them lazily stretch out on the ground, grooming each other. Lily is already perched in a nest, lying on her back, one leg propped up on the other. After several trips to Pooh's end of the island, she is visibly pregnant. Lakey, constantly on the move between one group and the other, is currently visiting Pooh. Kit, now 11, spends much of her time playing with the babies. Karen's position in the group has been greatly enhanced by Moise's birth and she enjoys the attention.

After pursuing Menchen and Menky around the trunk of a tabo tree in a dizzying game of chase, Dash collapses on the ground next to Karen and asks to be groomed. Startled awake from his nap, Moise greets Dash with his miniature version of a pant-hoot. With Karen's permission, Dash gives his first baby a few soft pats under the chin.

Relaxed and comfortable in her new role, Marianne gazes down at Wury, who is nestled in her lap. She grooms the baby while swatting flies away. Still attached to his adopted mother, Geza hovers over her shoulder, sucking on her earlobe. Marianne tolerates him for awhile before pushing him aside. He returns immediately and, sitting down beside her, places his finger in her ear. When Marianne removes his finger, he proceeds to put it in her nose. Preoccupied with Wury, Marianne patiently puts up with Geza. I am painfully aware, as they all are, that Lucy is gone.

The day quiets down and the light begins to fade. Grunting in unison, the chimps struggle to get up and make their way to their nesting site for the night. I watch them meander off through the bushes, one after another. Marianne grunts as she turns about, momentarily leaving little Wury wriggling and squealing on the ground between her feet. Turning back, she gazes down at Wury and, picking up the baby by one arm, holds her suspended in midair. As Marianne stands up, she gently drapes Wury about her neck. Dash follows close behind, making faces at Wury. On reaching the edge of the clearing, he stops for a moment and turns to look back at me, before he too becomes a glistening black spot in the distance.

Lucy had to move from the world of humans to that of chimps on her journey to successful life in the wild. In poignant moment of emotional transition, Lucy embraces Janis on visit just a year before Lucy's death.

It lowers the s

Can a car quiet the wind? In a sense, that is precisely what the new Honda Accord LXi is designed to do.

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ound of speed.

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HONDA

The Accord LXi

Opposite: The original Money Pit area. Old timbers are from the last major shaft, sunk back in the 1930s.

Aerial view of island (above) shows Smith's Cove at right, fence around pit in clearing at center left.

By Douglas Preston

Death trap defies treasure seekers for two centuries

After six lives lost and millions of dollars spent on excavation, the Money Pit on Oak Island, Nova Scotia, remains a deep mystery

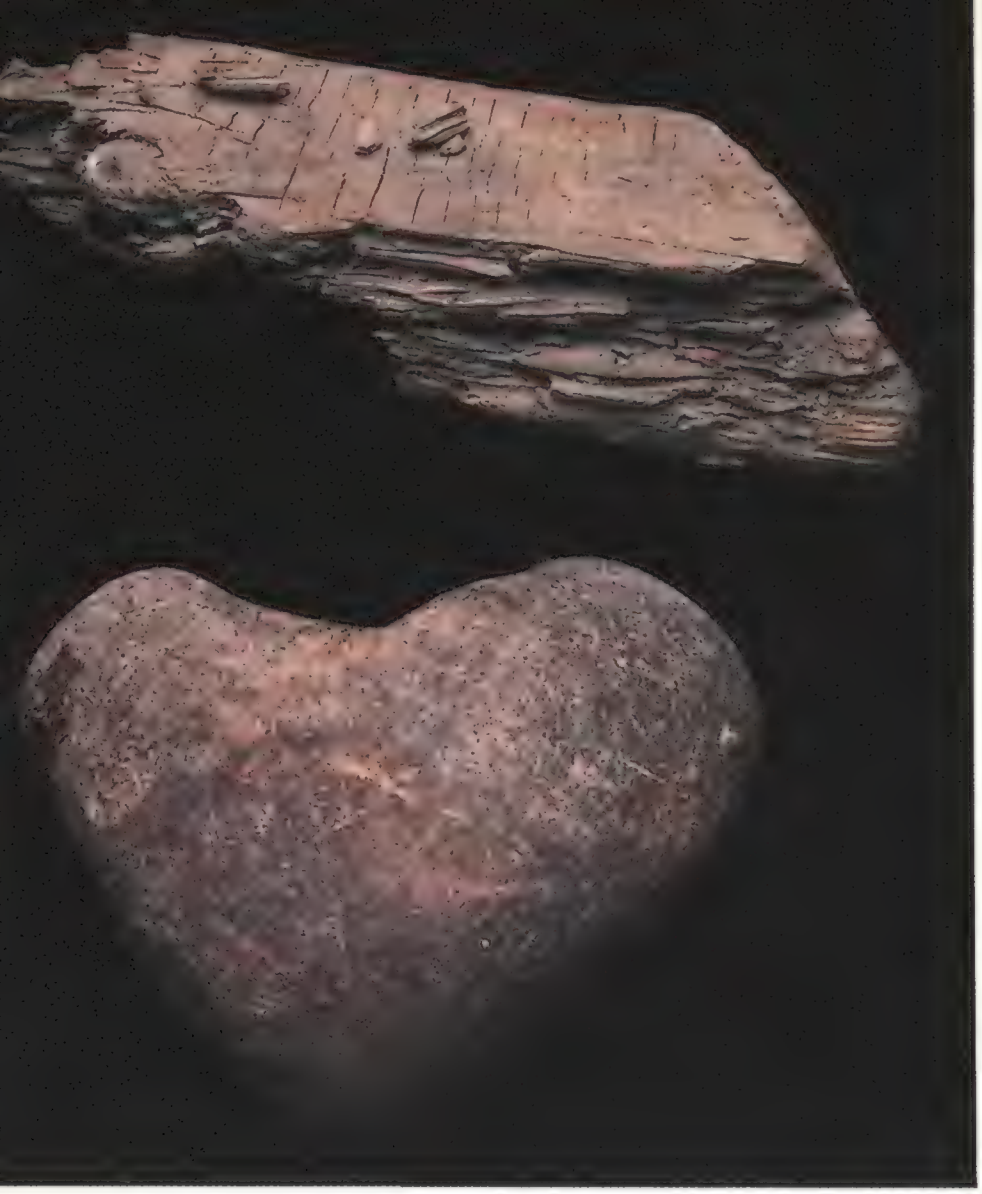
On Oak Island, everybody gets up early. By dawn, with the fog turning into a drizzle, the crew is hard at work. I've taken refuge inside the rusted hulk of an old tank car, where I can take notes without the ink smearing. Up the hill, men cluster around a drilling rig that is pounding its way into the island's interior. Shouts and curses echo through the fog. "Sand!" someone yells. "We're in sand, damn it!"

All around me lies the evidence of the hunt: big Ingersoll-Rand air compressors, enormous pump heads, piles of steel casing, acetylene tanks, strange infernal machines and bright aluminum ducts snaking their way across the ground. The chill September rain is slowly coating them all.

Seventy-nine years ago, a young law clerk named Franklin Delano Roosevelt trod this very ground with pick, shovel and high hopes. Adm. Richard Byrd, Errol Flynn and Vincent Astor all at one time or another took an interest.

Here in Mahone Bay, about 40 miles southwest of Halifax, Nova Scotia, I am at the site of the most intensive treasure hunt in history, a hunt that has lasted 193

Color photographs by Ovak Arslanian



Log from Smith's Cove dates from 1575. Heart-shaped stone is like ones said to be found in Haiti pirate bank.

Boring by Oak Island Treasure Company in 1896-98 yielded clues to a valuable trove very deep in the pit.

years, cost millions of dollars and killed six men. The raison d'être for it all is a narrow, water-filled shaft called the Money Pit—and what may be hidden in its muddy depths. To date, not one penny of treasure has been recovered. Nor does anyone know what might be buried here, who buried it, or why. The island stubbornly refuses to yield anything but the most tantalizing and infuriatingly ambiguous clues.

But the Oak Island mystery may soon be solved. Triton Alliance Ltd., a group of Canadian and American investors, is making the biggest assault yet on the Money Pit. They are digging a shaft of gargantuan proportions 20 stories into the very heart of the island. In doing so, Triton will either find treasure and uncover an important archaeological site, or they will have burned up $10 million digging an empty hole.

The mystery of Oak Island began in the summer of 1795, when a teenage farm boy named Daniel McGinnis decided to do a little exploring. He rowed out to Oak Island, tied up his boat and started poking around. His story, along with those of the many who have followed, goes something like this:

At the seaward end of the island, the thick forest of red oaks suddenly gave way to an old clearing, dotted with a few rotted stumps. In the center stood an ancient oak with a sawed-off limb. The limb showed evidence of rope burns and, in some versions of the tale, had an old ship's tackle hanging from it. Directly underneath, the ground had subsided into a shallow depression. From this, a young boy could draw only one conclusion: buried pirate treasure.

McGinnis returned the next day with two friends, Anthony Vaughan and John Smith, and they began digging. At two feet they struck a tier of flagstones. On pulling these up, they found themselves digging in what appeared to be an old shaft excavated in the hard glacial till, a mixture of clay, sand, gravel and rocks. The shaft had been filled with loose dirt and they could see old pick marks in the walls.

At about 10 feet they hit a platform of rotten logs, the ends embedded in the clay. They eagerly ripped these up and kept going. At 20 feet they struck another platform, and yet another at 30. With no end in sight, and no doubt their chores seriously in arrears, the three boys gave up—but only for the time being. Both McGinnis and Smith later bought land on the island, hoping eventually to reach the vast treasure that they were sure must lie at the bottom of the pit.

Douglas Preston was an amateur treasure hunter who grew up hearing about Oak Island. He is doing a book about the latest assault on the Money Pit.

Directors believed that vault with cement walls and iron bottom had fallen farther down the shaft in 1861.

Artifacts include Spanish-American scissors, coconut fiber used as dunnage by galleons, and bits of chain.

When a well-to-do man named Simeon Lynds heard the story, he enlisted workers, including the three young men, in a new assault. Work began in 1803. At 40 feet they struck another log platform. They continued to hit platforms at regular intervals, and they also encountered a layer of charcoal, a layer of putty and a layer of fibrous material that was later identified as coconut fiber.

At 90 feet they found something really exciting—a flat stone inscribed with mysterious figures (p. 63). They quickly tore up the platform beneath it. Soon, water began seeping into the pit and they found themselves bailing as much as digging. As night came on, they probed the muck at the bottom of the pit with a crowbar and struck something hard at the 98-foot level.

"Some supposed it was wood," one researcher wrote later, "and others called it a chest. This circumstance put them all in good spirits and during the evening a good deal of discussion arose as to who should have the largest share of the treasure."

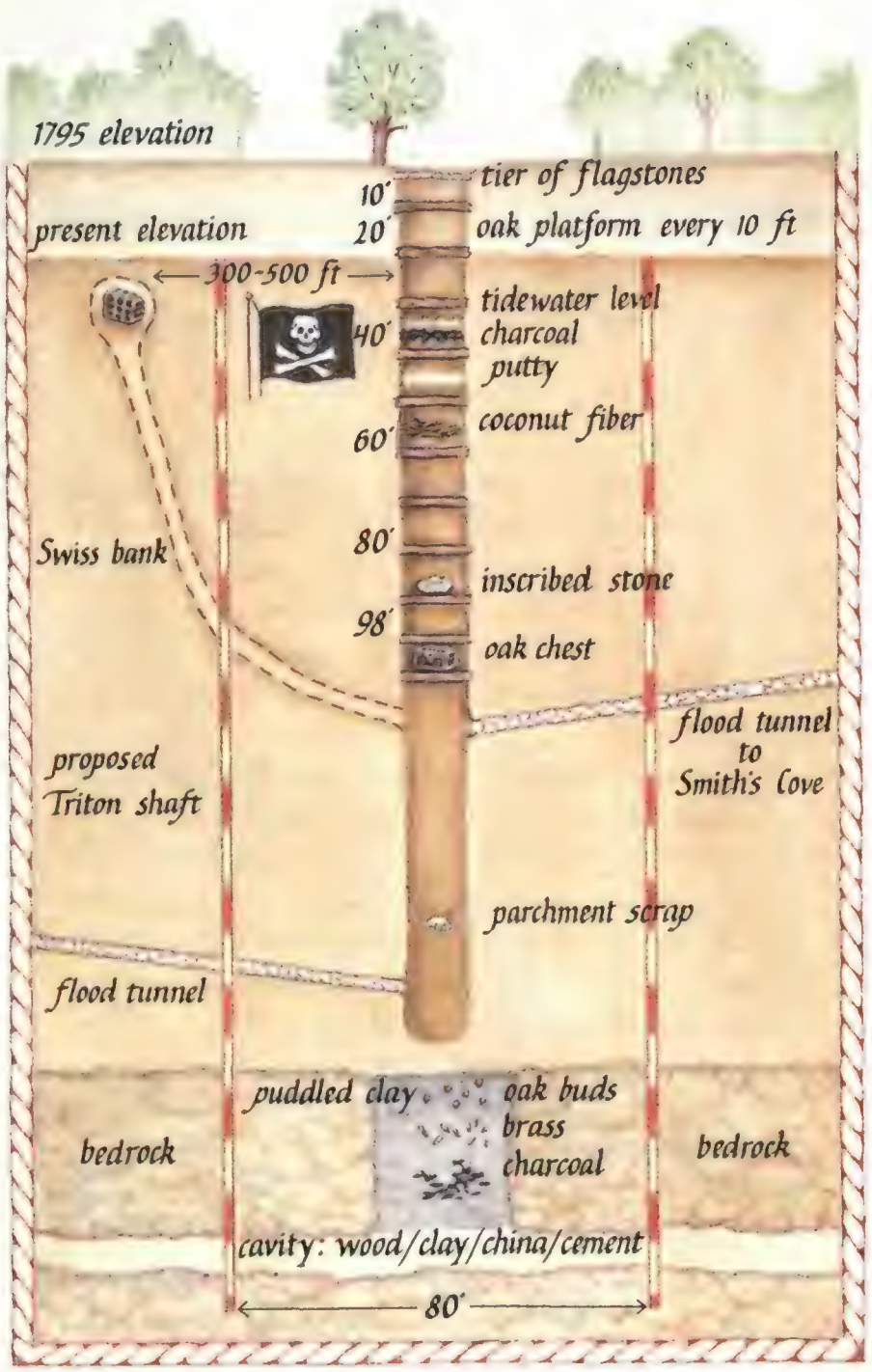
There would be no sharing of treasure. The next day the diggers arose to find the pit 60 feet deep in water—*salt* water. Bailing proved to be as futile as bailing out the ocean.

This first, failed effort was only the beginning. Syndicate after syndicate was floated to get to the bottom of the pit. They dug, pumped, excavated, drilled, dynamited, trenched, cribbed, bulldozed and blasted the island, turning the eastern end into a cratered wasteland. At some point in the early 19th century the original hole was nicknamed the "Money Pit," although the only direction money seemed to go was into the pit, not out of it.

In 1849 diggers built a platform over the Money Pit and cored down with a pod auger, a primitive type of drill. The drilling engineer, Jotham B. McCully, later stated that the drill struck wood at 98 feet, dropped through 12 inches of space, then rattled through "22 inches of metal in pieces," struck more wood, another 22 inches of metal, then wood, then soil. The auger failed to bring up any metal except three links of a gold chain which, McCully theorized, "had apparently been forced from an epaulette."

Around this time, treasure hunters made another curious discovery. One day a workman was sitting alongside the cobbled beach at Smith's Cove, a small cove 500 feet east of the Money Pit (p. 53). He noticed that as the tide ebbed, the beach "gulched forth water like a sponge being squeezed." The crew immediately built a cofferdam around the spot and excavated the beach. To their astonishment, they discovered that the beach was a fake—that is, it had been made to look like

Death trap defies treasure hunters



Cutaway gives idea of what has been found in Money Pit. Red, white columns define excavation planned by Triton. Broken lines show hypothetical tunnel to "Swiss bank" where treasure may have been cached.

a beach but was, in fact, a giant filtering and drainage system. Underneath the cobbles they found thick layers of eel grass and coconut fiber lying on top of an elaborate system of box drains. The drains led, like the five fingers of a hand, to a point opposite the Money Pit. They were, apparently, the head of a "flood trap" designed to keep the pit filled with water.

(The reader may well wonder how the original diggers intended to retrieve their treasures from such a death trap. Current theories, for which there is yet no evidence, are convincingly simple. Once the pirates—let us call them that for the moment—had dug the Money Pit sufficiently deep, they would have started side shafts that sloped gently back toward the surface. Treasures would have been hidden in the ends of these side tunnels, 300 to 500 feet away from the Money Pit but perhaps only 30 feet below the surface. The pirates would have known the direction and distance from the Money Pit, left highly visible as a decoy, to each of the treasure troves and it would have been a simple matter to dig them up.)

In 1897, drillers brought up more strange clues. From the 155-foot level, the drill bit carried up a half-inch-square piece of parchment with two letters written on it with a quill pen. In another hole the drill was stopped cold at 126 feet by what seemed to be an iron plate. A magnet was raked through grit brought up from the hole and it pulled out thousands of iron filings. A year later, dye dumped into the pit emerged from the seabed at Smith's Cove, providing more evidence of a tunnel connection. But it also emerged from the South Shore Cove, establishing the existence of two flood tunnels, thus making things more complicated.

Estimates climb into the billions

Everyone assumed that whoever would go to that much trouble must have buried an enormous treasure. Around the turn of the century, fortune hunters estimated it at $10 million; by the 1930s, this had doubled; by the '60s, some people were talking about $100 million or more. Today it is pegged at $500 million to "several billion."

So what has been the problem? Why in the world hasn't someone been able to get to the bottom of the Money Pit?

The blame can be laid squarely on the treasure hunters themselves. Until Triton took over, each digger had believed he was almost there and worked in a frenzy. Many syndicates kept no records. Important artifacts were thrown away, lost or destroyed. Drillers so churned the ground that much of the really significant evidence was obliterated to a depth of 150 feet.

That's not all. In 1861, so much digging had been going on that the bottom dropped out—literally. One

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Shacks and equipment of Triton Alliance encircle 150-foot-deep Borehole 10X. Gaping pit in foreground is result of a natural cave-in 110 years ago, directly over suspected route of flood tunnel to Smith's Cove.

weekend the diggers heard a crash echoing out of the Money Pit and rushed over in time to see the bottom of the pit drop into a void. Then, as they watched in horror, 10,000 board feet of cribbing unraveled and sank into the opening; shortly thereafter the pit itself caved in with another loud thump. Everything had vanished into an underground morass.

As if that weren't enough, the water seemed unstoppable. You could dig a shaft as deep as you wished, but as soon as you angled it toward the Money Pit, bang! the water burst through and it was every man for himself.

Worst of all, the treasure hunters managed to lose the Money Pit itself. So many pits, tunnels and shafts had been dug that eventually nobody remembered exactly where the original was.

Of all the stories surrounding Oak Island, the one about the severed hand is by far the strangest. It was seen in a water-filled cavity at the bottom of a shaft known as Borehole 10X. The cavity was found during test drilling in the late 1960s; a narrow shaft was sunk to explore it further. In 1971, Dan Blankenship had enlarged Borehole 10X to the point where he could finally fit an underwater video camera down through it. He was monitoring the screen in a nearby shack while three crew members manned the equipment outside. The camera shortly came to rest in the cavern. There was a moment of silence. And then the crew heard a bloodcurdling yell from the shack.

"I called in each man," Dan recalls, "one at a time. I didn't say anything, just pointed to the screen. And each man said, 'Damn, that's a hand. That's a human hand.' The hand appeared to be floating in perfect equilibrium in the water."

Come on. A human hand?

Dan looks me straight in the eye. "Now I don't say I *think* I saw a human hand in there. I don't say that. I *saw* a hand. There's no question about it."

Once again, Oak Island had thrown up a maddening, intriguing clue. After a while you start asking yourself, What is real? How do you separate fact from fiction? Where's the truth?

At one extreme is Mildred Restall. "You see that vase over there?" she asks angrily, pointing to a white vase on her windowsill. "There's no such thing as the truth anymore. You can say that vase is black long enough until you believe it and it becomes the 'truth.' That's what I mean about Oak Island. Where did they get the idea that there's something down there? I ask you, *Where?*"

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Mildred Restall has good reason to ask the question. While most Oak Island treasure hunters gave up their careers and life savings for the hunt, she gave up much more: the lives of her husband and first-born son.

It happened on August 17, 1965. She and her husband, Bob, had been living on the island since 1959 while he hunted for the treasure. What happened that muggy day has never been entirely explained. Restall apparently was inspecting one of his pits when he blacked out and toppled in. His son Bobby came to his rescue, but when the other workers arrived they saw both father and son lying in the black water at the bottom. Four of them descended and were quickly overcome by fumes in the pit. Two were rescued but the others, along with the Restalls, died—by drowning. The toxic gas was never identified.

Now Mildred lives alone in a bungalow; her living room looks across a patch of wild blueberries and chokecherries to the spruce-clad outline of Oak Island. She starts telling me about her early life, how she happened to end up on Oak Island.

"My husband and I," she says, "we rode the Globe of Death." On their motorcycles, Bob and Mildred would enter a sphere of steel mesh only 16 feet in diameter. Then they would accelerate their bikes at right angles to each other, sometimes reaching speeds of nearly 50 miles an hour and crisscrossing each other's paths twice each revolution. Bob made vertical loops while Mildred roared around the globe's equator.

The Restall family—Mildred, Ricky, Bob and Bobby—relaxed in 1964 on top of Money Pit scaffolding.

Mildred smiles and looks out to sea. "We had a good act—there's no getting away from it. You could just hear the gasp from the audience." After a moment she adds, almost to herself, "All the great circus acts were husband-and-wife teams."

Mildred Restall, former daredevil motorcyclist, visits the cemetery where her husband and a son are buried.

She looks out her window, focusing on Oak Island in the distance, and sighs. "Why don't they just leave it go, let it stay a mystery?"

In 1968, a Montreal businessman named David Tobias took over in partnership with Dan Blankenship, who had been waiting for an opportunity to get involved. The following year they formed Triton Alliance Ltd.

Tobias attracted a strong group of investors, from the past president of the Toronto Stock Exchange to the chairman of one of Canada's largest chains of supermarkets. The company was initially capitalized at Can$520,000 and Tobias became its president.

Recently I visited Tobias in Montreal. Dressed in a blue flannel suit and smoking a pipe, he didn't look much like a treasure hunter. In fact, he says, he really isn't a treasure hunter.

Born in Winnipeg, Tobias grew up working while he attended high school and college at night. After World War II he became a salesman for a packaging company, and later acquired a company in the same industry. Today he lives in a large old house on the side of Mount Royal in Montreal. These accomplishments might satisfy most people, but not Tobias. "I wanted to do something," he says, "that no one had ever done before." That "something" is to solve the

Dan Blankenship works at rig drilling pump hole to "dewater" Triton's profitable Borehole 10X.

mystery of Oak Island once and for all. "Certainly I'm interested in finding something of value," he says, "but for me, the archaeological aspects are also important. We don't like to call ourselves a treasure hunt."

Will they be hiring a professional archaeologist?

"Yes, we surely plan to do that," Tobias says. The problem, he explains, is that so much sensationalism and hype have swirled around Oak Island that archaeologists have been scared away. "What this thing needed was a totally fresh approach," he says. "This is potentially a site with tremendous archaeological interest. This is important for Canada."

Triton has drilled more than 200 cores on the island. The drills have gone much deeper than any of the shafts, right down into the bedrock at about 165 feet. Directly under the Money Pit, the drillers found a roughly circular hole in the bedrock that had been filled with puddled blue clay, earth that had been worked while wet to form an impervious mass—a waterproof plug. Inside the drill cores returned to the surface were bits of brass, charcoal, wood, china and cement, along with oak buds. Still deeper the drillers found a natural horizontal cavity now filled with dirt. Cores from this region brought up more bits of wood and china.

"Then," Tobias recalls, "we went to Smith's Cove. I was hoping to make some dramatic breakthrough."

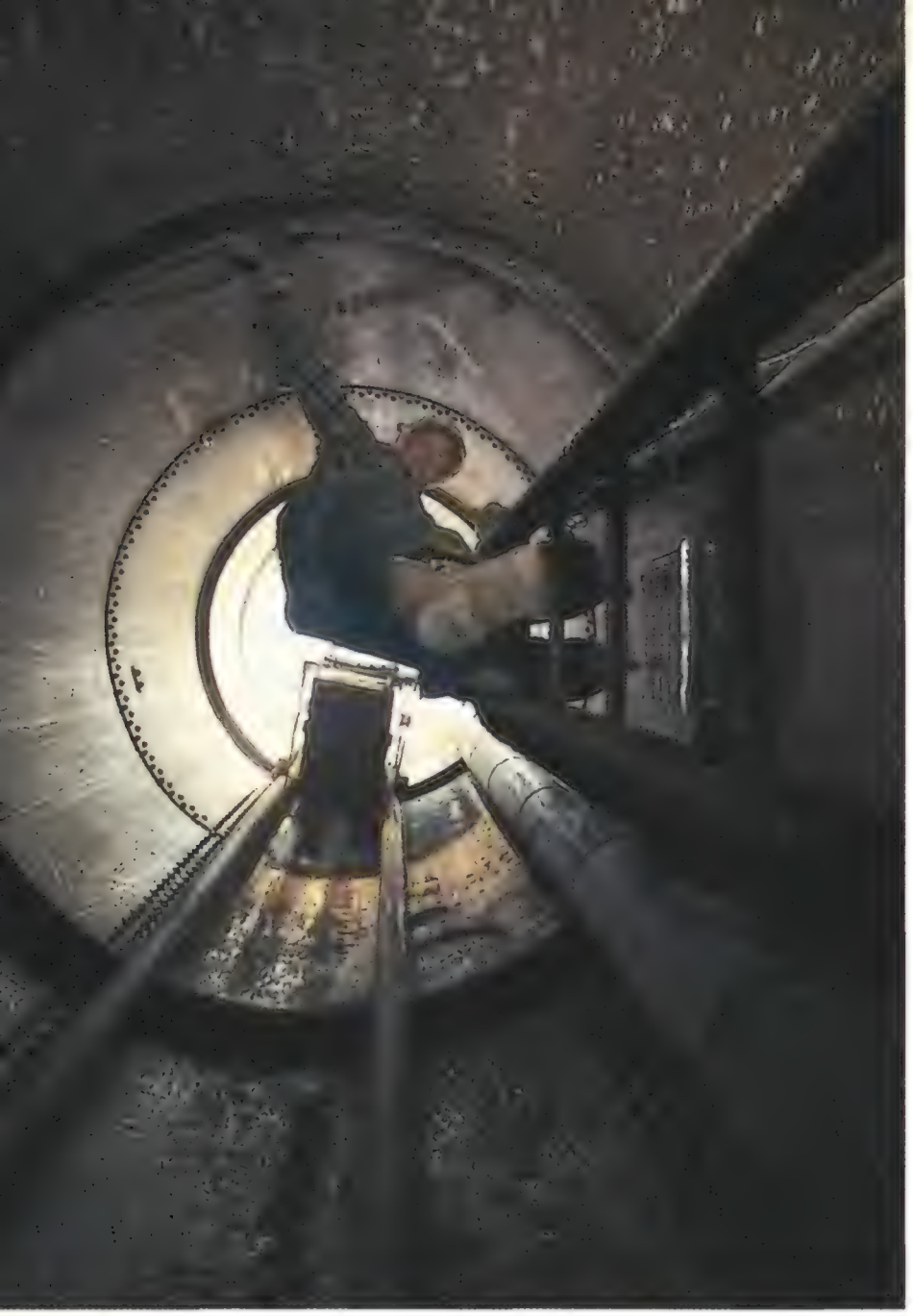
Several feet under the beach, they found a low rock wall, presumably a remnant of the box drains discovered 100 years ago. Lying on top was a layer of fibrous material, which Tobias himself picked off and sent away for analysis. They also found the half-moon remains of an old wooden cofferdam across the mouth of the cove, as well as a curious heart-shaped stone, a pair of hand-wrought iron scissors, and other artifacts (pp. 54, 55). The cofferdam remains were beyond where any previous dams had been built, suggesting that it was constructed by the original builders of the pit.

Tobias starts piling lab reports in front of me. Every artifact, in addition to the soil itself, has been exhaustively analyzed. Once again, the fibrous material was identified as coconut fiber, this time by the chief botanist at the National Museum of Natural Sciences in Ottawa. Several iron spikes from the cofferdam were analyzed by the Steel Company of Canada and found probably to have been forged prior to 1790. The wood brought up from the Money Pit area dated to 1575, plus or minus 85 years. One sample was identified as crude lime cement, "likely to reflect human activity." The bits of brass and iron proved to be crude alloys whose microscopic structure suggested a time earlier than 1790.

Taken separately, the bits and pieces of evidence might not be all that conclusive. But taken together, they appear to add up to the fact that something happened on Oak Island at a great depth, prior to the 1795 discovery of the Money Pit.

To say that there are a number of theories is putting it mildly. Virtually every treasure reported missing over the past 500 years has been placed, at one time or

Blankenship (left) and president David Tobias check engineering plans for massive assault on the Money Pit.



Interior of Borehole 10X is lined with old railroad tank cars eight feet in diameter and made of thick steel.

another, at the bottom of the Money Pit. The most enduring theory holds that Oak Island is buried pirate treasure. The area was heavily frequented by pirates in the 16th and 17th centuries; Mahone Bay, a major feature of the Nova Scotia coastline, takes its name from the French word *mahonne*, a low-lying craft used by Mediterranean pirates.

The perennial favorite for this theory is Capt. William Kidd. Kidd petitioned the House of Commons 11 days before his scheduled execution in 1701. He offered them a deal: if they would delay the hanging he would lead a fleet to the spot where he had buried his large East Indian treasure. His petition was refused and Kidd was executed on schedule. Unfortunately, there is no evidence that Kidd went anywhere near Nova Scotia.

Then there is the statement Blackbeard made shortly before his beheading for piracy. "I've buried my treasure," he bragged, "where none but Satan and myself can find it." If there ever was an accurate description of the Money Pit, this is it.

A more plausible theory maintains that Oak Island was a sort of Swiss bank for pirates. Similar caches have reportedly been found in Haiti and Madagascar, although such discoveries have not been confirmed by archaeologists. A number of pirate captains would band together, sink a deep central shaft, dig the appropriate number of side tunnels to accommodate the booty of each, then bore the flood tunnels that would leave the main shaft booby-trapped. At the site of one of these banks in Haiti, a number of heart-shaped stones similar to the one found at Smith's Cove were reportedly found.

Tobias thinks that Sir Francis Drake might have been responsible. In the late 16th century, Drake was given a secret commission from Queen Elizabeth I to prey on Spanish shipping, provided he turned the loot over to the Crown. Like other buccaneers, Drake may have decided to stash away part of the booty for himself, or the pit may have been part of the original plan to have a repository on this side of the Atlantic.

More recently, some historians have come to feel that no pirate crew could have had the discipline and organization to construct something as elaborate as the Money Pit. One historian who has taken more than a passing interest in Oak Island is Mendel Peterson, former chairman of the Department of Armed Forces History at the Smithsonian's Museum of American History. He headed the Institution's past programs in historical archaeology and underwater exploration. Peterson refused to speculate on who might have constructed the Money Pit. "But from what I know about the engineering involved, the resources that would have to have been mobilized and the complicated structure of the Money Pit, I think it has to be the work of a government—or at least a very large, powerful organization. It couldn't have been pirates. Impossible."

Over the years, a veritable army of dowsers, mediums, soothsayers, automatic writers, spiritualists, psychics, card readers, channelers and crank inventors have descended on Oak Island. They have located at the bottom of the pit everything from the secrets of the pyramids and the Holy Grail to the original drafts of Shakespeare's plays and the Crown Jewels of France.

"Most people around here laugh"

Oak Island also has its skeptics, many of whom have lived in Western Shore, the town opposite Oak Island. For nearly 200 years they've been seeing treasure hunters come and go—empty-handed—and hearing all the claims many times over. Clyde Vaughan, who is the great-great-great grandson of Anthony Vaughan, one of the original discoverers of the Money Pit, thinks it's all a trifle ridiculous. "To tell you the truth, most people around here, they more or less laugh about the whole thing," he says placidly in his kitchen.

Some have suggested that the Money Pit might be nothing more than an old sinkhole. This, they claim, would explain the original depression in the ground, the log "platforms" (blowdowns that periodically washed into the pit) and the flood "traps" (natural watercourses in the bedrock). It would explain the hole in the bedrock found by Triton, and also how artifacts worked their way into deep caverns under the island. On the other hand, like most Oak Island theories, this one leaves a lot more unexplained than explained—notably the findings at Smith's Cove and the masses of coconut fiber. Mendel Peterson dismisses the sinkhole theory but thinks that the original engineers might have enlarged an existing sinkhole.

So how is Triton going to succeed where all others have failed? "Money," says Tobias. "Money and good planning."

The plans include the construction of an enormous shaft, the biggest yet, right in the Money Pit area. Eighty feet in diameter and extending about 200 feet into the ground, it will require the removal of at least 960,000 cubic feet of earth weighing close to 50,000 tons. The shaft was designed by Bill Cox of Cox Underground Research.

What about the water problem?

"All indications are that the water is at most 1,000 gallons per minute," says Cox. "You hit a flow like that in a small shaft and, sure, it'll fill up awful quick. In a large shaft, you can stand there and watch it come in. Then you can pump it down and seal it off. We'll arm the site with 6,000- to 8,000-gpm pumping capacity, ready to go into action immediately."

Most important, the shaft will be large enough to encompass most of the earlier workings and to place the walls in hard, virgin ground. As they go down, the interior walls will be carefully examined for signs of the postulated side tunnels leading to treasure.

Cox refuses to speculate about what might be down there. "My involvement," he says, "is to sink a shaft that will solve the mystery totally and forever, so completely that nobody will go back. It will be the decisive conclusion to Oak Island."

Tobias himself hates to speculate on how much treasure might be down there, but at one point I did get a hint. We were having lunch in an elegant Montreal restaurant and I asked him once again.

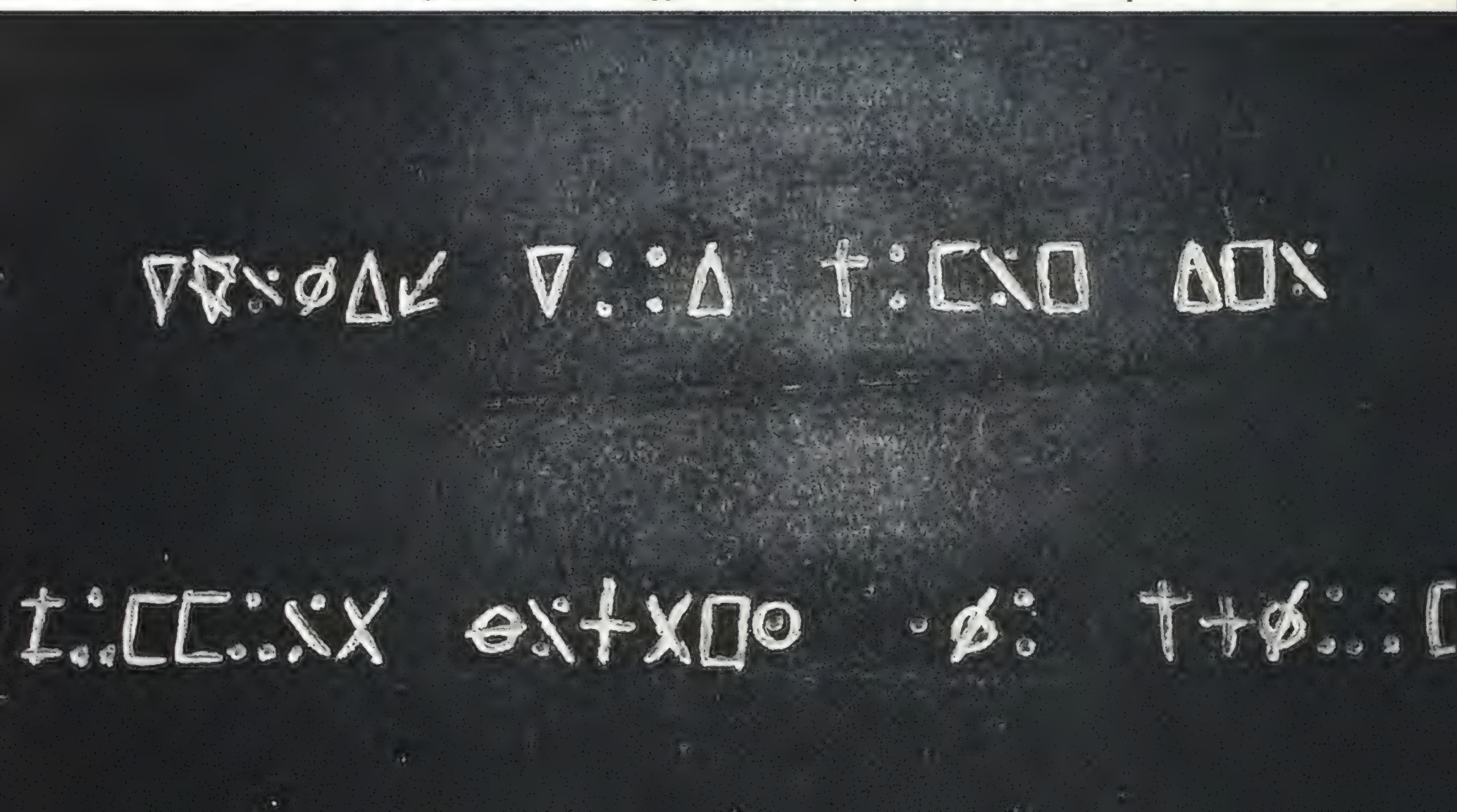
He leaned forward. "There are some who say there could be as much as several billion down there."

If that's true, I replied, then this could be as big as the discovery of King Tut's tomb.

"I hate saying things like that," Tobias responded, "but, yes, it could be as great a discovery as King Tut's tomb."

Or it could be a $10 million hole.

Facsimile of a stone found in the pit in 1803 (it was later lost) shows the markings that excited the diggers. Last year an IBM cryptologist translated them as "Forty feet below two million pounds are buried."



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By Bennett Schiff

A genius wrought from 'fifty dollars worth of marble'

Chipping away at destiny, Henri Gaudier almost achieved immortality; then the Great War suddenly ended his life at the age of 23

Ezra Pound bought a half-ton block of marble for Gaudier to sculpt his head with hand-forged chisels.

Henri Gaudier must have been a difficult young man to bear. He could be delightful, but he was more often brash, abrasive, stubborn and unyielding in his opinions, which he hurled forth as inspirational gospel. It is probable that only a sense of his significance made him acceptable to many cultivated and intelligent people who not only tolerated his tiresome ways but were stimulated and impressed by him. You could put up with a lot if you had the feeling at the same time that the vibrations and emanations you were experiencing were being put in motion by an authentic virtuoso, that you were in the presence of genius at the flash point of germination.

For some time I have been looking at a photograph of him pinned to a bulletin board above my desk. It is a half-figure shot, a three-quarter view of the face, the eyes confronting you head on. The expression is both questioning and declarative. It is an assertive expression but not unfriendly. There is a hint of humor about the mouth but also you feel that it could bite. The nose is a generous prow. The upper lip is narrow, the lower slightly pendulous. He wears a slender mustache and a line of fuzz extends from his ears, down along a well-defined jaw and converges full center to a wispy goatee. The eyes pin you down. They have been described as being black, so dark a brown were they. The photograph has the three-dimensional force of a piece of animate sculpture. It inhabits the room, an enigmatic and formidable presence.

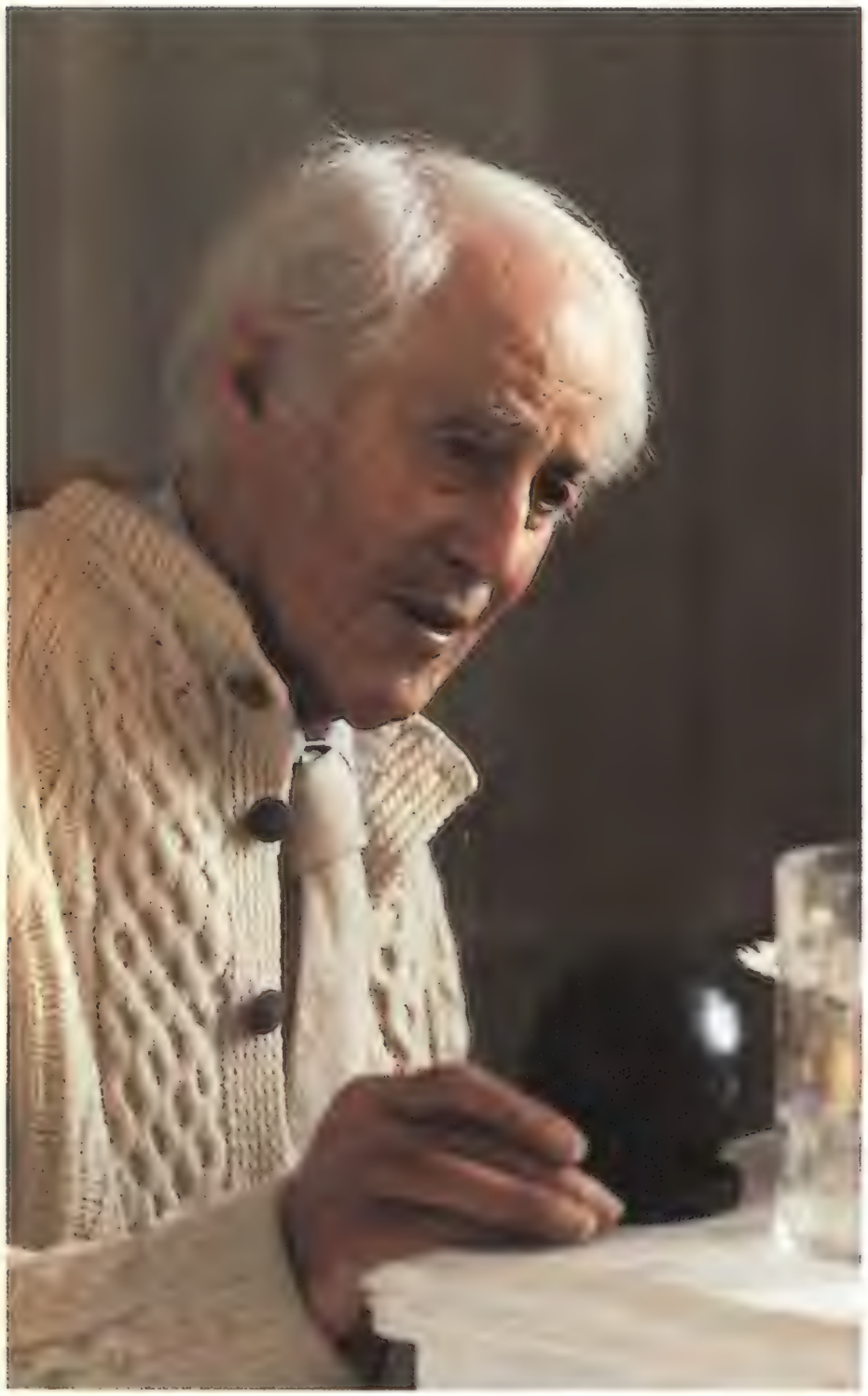
"He put out his thin arms and surrounded us"

Enid Bagnold, the English novelist and playwright, met Henri early in 1912 at the apartment of Haldane Macfall, a critic who was the first person in the art world to befriend him. She told of an incident one night after a group of artistic and literary types had left a party at Macfall's and were in the Underground. "It was winter," she wrote, "and a wind like a wolf galloped down the Tube tunnel. . . . Gaudier, his long front hair hanging in a string down the side of his white brow, was throwing his future and his past and his passion into the discussion. We lazier English stood and shivered, and tried to back out of the wind. Gaudier felt our bodies moving, grouped, away from him, and I remember as he talked, and his eyes and pale face shone, he put out his thin arms and surrounded us and held us fast in the wind so that our edging movements should not distract him." She continued: "I did not really like him. But that is no judgment on either of us. Gaudier never seemed to like anyone. He rushed at people. He held them in his mind. He poured his thought over them, he burnt his black eyes into them, but when in response they had said ten words, they were jabbed and wounded, and blood flowed."

Hirschl & Adler Galleries, New York

"You understand it will not look like you," Gaudier told his friend Pound before he began *Hieratic Head of Ezra Pound.* Instead, "It will be the expression of certain emotions which I get from your character."

A sculptor's unfulfilled genius



H. S. Ede, who bought Gaudier works when nobody wanted them, put them on display in Kettle's Yard.

Gaudier's relationship with Ezra Pound was something else again. For Pound it was an epiphany. The ardent guru of the new, the deliverer of manifestos, the arbiter of what was revolutionary in creativity saw here a new light. Pound felt that Gaudier's work was the best being done in Europe.

Pound tells about their meeting in his book on Gaudier published in 1916, a year after Gaudier's death. He was wandering around an exhibition at the Royal Albert Hall in 1913 when "a young man came after us, like a well-made young wolf or some soft-moving, bright-eyed wild thing." Pound had been admiring a Gaudier sculpture. "I turned to the catalogue and began to take liberties with the appalling assemblage of consonants," he wrote. "'Brzxjk—' I began. I tried again, 'Burrzisskzk—' I drew back, breathed deeply and took another run at the hurdle, sneezed, coughed, rumbled, got as far as 'Burdidis—' when there was a dart from behind the pedestal and I heard a voice speaking with the gentlest fury in the world: *'Cela s'appelle tout simplement Jaersh-ka. C'est moi qui les ai sculptés.'*

"And he disappeared like a Greek god in a vision."

He called himself Henri Gaudier-Brzeska. His death in the trenches of World War I not only ended his short, not-that-happy life, it also snuffed out what fully promised to be one of the great artistic talents of the century. Gaudier-Brzeska's untimely death and the clear declaration of his art raises the inevitable question: What if he had lived?

For reasons that have more to do with popular culture than with Culture, the lives of artists seem to be of more interest to many people than their art. This is turning things back to front, of course, but there is something about how some artists lived, or are supposed to have lived, that magnetizes attention.

The ennobling virtue of his quest

It must be that an artist is a special kind of person in the popular imagination: a sort of hero, perhaps, a tragic figure. What makes the idea of the hero or tragic figure—Hamlet, Don Quixote, Lancelot—so gripping is, underneath all, the ennobling virtue of his quest. And although the definitive, or even a deeply exploratory, study of Gaudier's work is yet to be done, what we know of it, together with the circumstances of his life, combine to put him in the category of the artist of genius up against implacable odds.

Gaudier's life ranks high with the most colorful and tragic of these.

There was a love affair of profound passion but no sexual contact with an emotionally tortured and pathetic woman twice his age, Sophie Brzeska. There was biting poverty, working at makeshift jobs, the brutal

Tate Gallery

Sophie Brzeska, "an emotionally tortured and pathetic woman twice his age," became Gaudier's companion.

His expression "both questioning and declarative," Gaudier-Brzeska looks out from a 1914 photograph.

exhaustion of just trying to get along, and there were some of the great names of the time, Ezra Pound, Frank Harris, Jacob Epstein and Katherine Mansfield among them. And finally, there was the Great War.

Everything was there for a movie and in 1972 there *was* a movie to be sure called *Savage Messiah*, made by that English master of cinematic exaggeration, Ken Russell, which apparently for good reasons sank like a lead duck.

Russell got the idea for the movie, and the title as well, from a book on Gaudier by H. S. (Jim) Ede, published in 1931. And even Ede is a tale you could make a movie of. It would tell the story of a young art historian convinced of Gaudier's genius at a time when his work had already fallen from sight, its blaze extinguished. Of how Ede dedicated himself to gathering Gaudier's work with the idea of having it properly appreciated one day. Of how he gave his home, four simple connected cottages in Cambridge with a lifetime's collection of art, including a significant representation of Gaudier's work, to Cambridge University. Called Kettle's Yard, the cottage and an adjacent gallery form one of the world's most charming little enclaves. And of how Ede obtained the copy of Sophie Brzeska's intimate diary and Gaudier's letters to her from which he pieced together the story of the volatile sculptor's life and art.

Feverish, manic and depressed alternately, Gaudier could be a charming, lighthearted companion one moment and a vituperative one the next. But even when he was with people he was still, in a private and inviolable way, alone, an isolated, greatly talented adolescent. The one person with whom he felt intimate was Sophie Brzeska.

He confided in her, confessed to her, teased her to distraction, called her by a dozen pet names, missed her in misery when they were apart and loved her, there is no doubt. She was obsessed with him, thought of him as a son, supported them both at times with the scant sums she was able to earn as a governess and teacher of French and, because she steadfastly refused to have sexual relations with him, preferring to mother him in sheltering arms, would even offer to pay for visits to prostitutes.

The odd couple met in Paris in a library. She was 38.

Bennett Schiff, a member of SMITHSONIAN*'s Board of Editors, wrote about Matisse in November 1986.*

He was 18. They spent the next five years together, his last ones. Sophie Brzeska lingered on for ten years after Gaudier's death, declining steadily into madness. She died destitute in a government asylum.

Born at St. Jean-de-Braye, a small place near Orléans, on October 4, 1891, Gaudier went brightly through school at Orléans, where he won a scholarship that took him to London for two months. A year later he won another, larger scholarship worth 3,000 francs with which he went to college in Bristol. He had begun to draw very well as a child, but it was at Bristol when he was 17 years old that it became clear that drawing and art itself were what he wanted to do more than anything else.

"The woman I love is 30 years old—you smile"

In 1909 he left England for Nuremberg, where he stayed with a Dr. Uhlemayr while he studied art. For some time after he left Germany he corresponded with Dr. Uhlemayr, pouring out his heart and mind. He wrote of Sophie Brzeska: ". . . the woman I love is 30 [she was then 39] years old—you smile—I love her with a purely ideal love, it is a flow of sensation which you must feel, since words are too coarse a medium to convey it." She had "a beauty à la Baudelaire—and might have stepped out of *Fleurs du mal.* She is lithe and simple, with a feline carriage and enigmatic face, the fine character of which reflects her most intimate thought—planes combining in the most surprising manner, impressions of age and of youth in alarming contrast. In a word, we are both as mad as hatters."

Before he had met Sophie, in the first months after he had gone to Paris from Germany, he wrote to Dr. Uhlemayr of his work, ten hours a day doing translations and letters in a bookshop, of his studies in art, visiting museums, making copies, drawing anatomy each night at the Ste. Geneviève Library where he met Sophie. He read Taine's *Philosopy of Art* and Henri Bergson's *Creative Evolution* and wrote knowingly about these abstruse works to Dr. Uhlemayr. His mind was as nimble, energetic and analytical as his fingers.

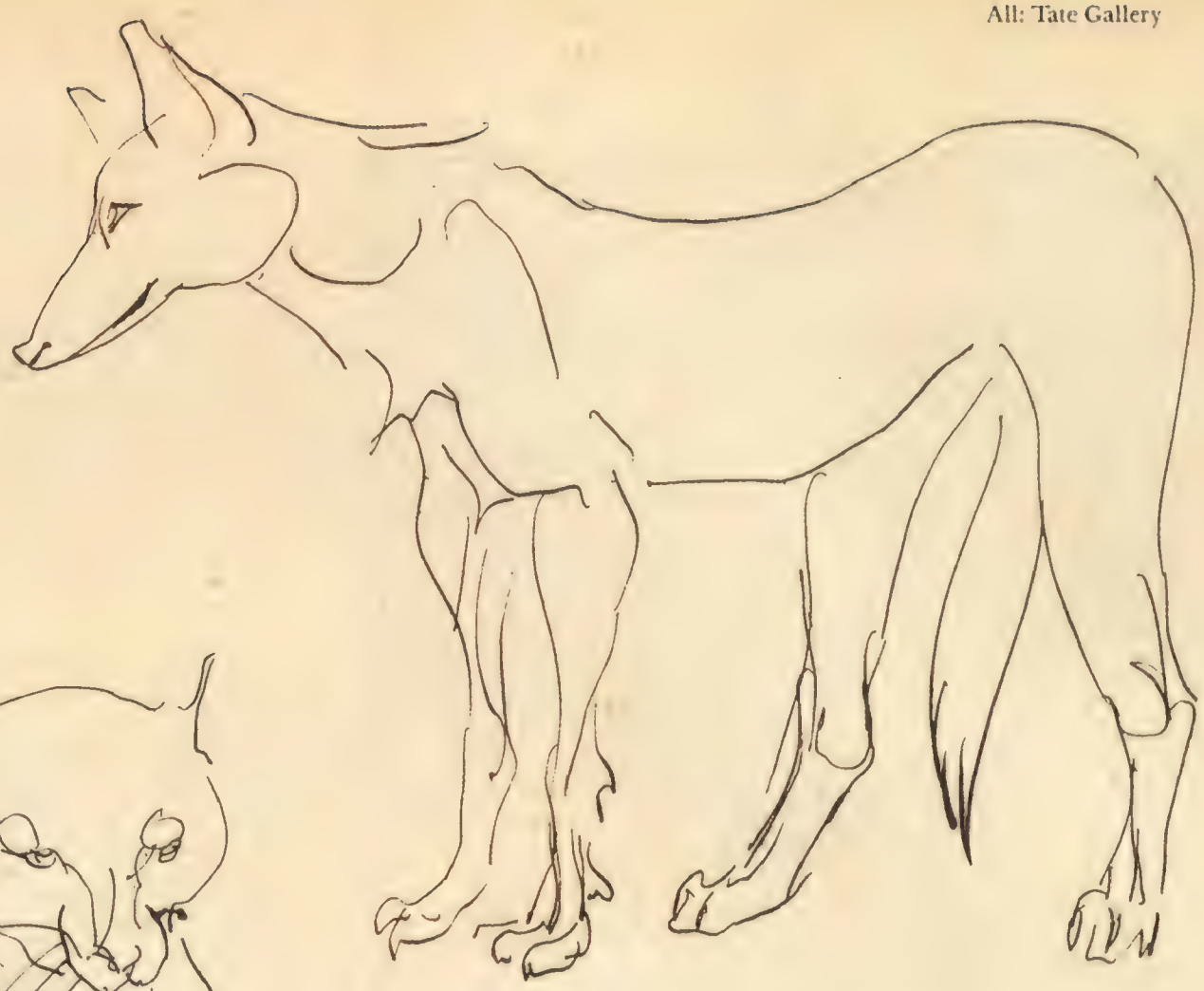
When Gaudier met Sophie Brzeska she was studying German at the library but her intended purpose in going to Paris was to commit suicide. Friendless, poor, mentally ravished, she lived a hallucinatory life. ". . . she was a woman who was bodily ill and mentally diseased, whose life had been a succession of continual emotional crises; of terrors, intuitions of evil, forebodings of madness, outbursts of rage, meditations of suicide and intimations of her own greatness," Ede wrote.

She had been born to a lawyer and his wife in a large house near Kraków. There were eight brothers and she was resented as the only girl. Her childhood was a miserable one. She studied in Kraków, then went to

Standing Female Nude, one hand on hip could have been a study for a sculpture the artist had planned.

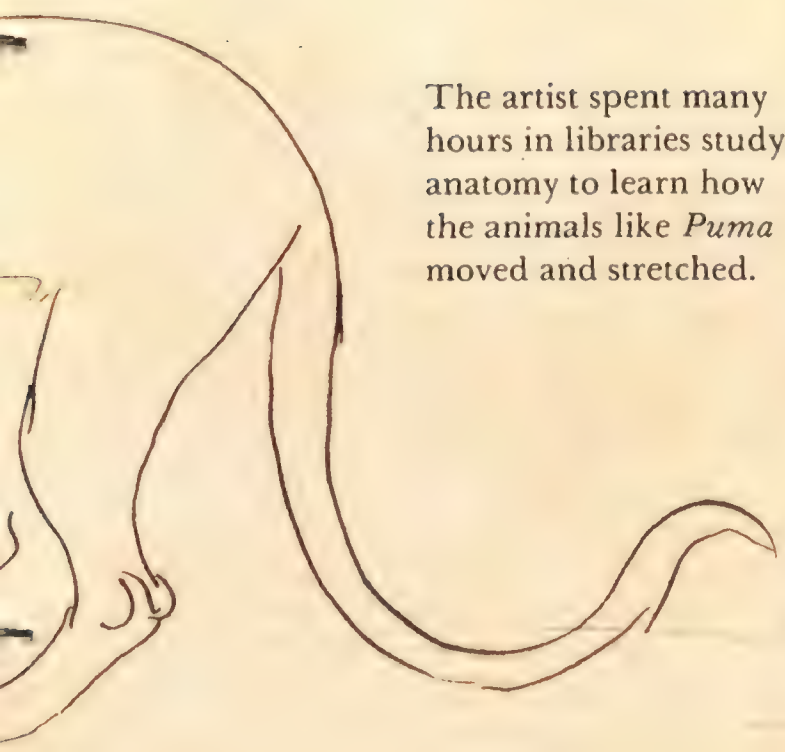
All: Tate Gallery

Brought up in the country, Gaudier loved animals; he often went to museums and zoos to sketch such wild creatures as *A Wolf*.



He found cats to be particularly satisfying subjects and he might well have drawn *Leopard* at a zoo.

Vulture IV is one of several predatory birds that Gaudier sketched as he experimented with the arrangement of plumage.



The artist spent many hours in libraries studying anatomy to learn how the animals like *Puma I* moved and stretched.

Kettle's Yard Gallery, University of Cambridge

Early studies for *Bird swallowing a fish* show bird with legs, but final version eliminated them.

Tate Gallery

Nina Hamnett stood guard while Gaudier stole a piece of marble from a stonemason's yard for her *Torso.*

Paris where she was a nursemaid. That didn't work out, and she went from one such job to another, finally finding employment with a family going to Philadelphia. That didn't work out either and she went to New York, lived in a home kept by nuns and plunged into another cycle of quickly terminated household jobs. She scrimped and saved until she was offered a chance to return to Paris. She was then 36. Unable to find work there she was forced to return to Kraków, where things were as bad as usual. She fled once more to Paris with suicide on her tormented mind. It was in this state that she met Gaudier. Here, at last, was a friend. Their lives became intertwined. Gaudier told her that he was fully satisfied with her motherly love. He later changed his mind, but she did not change hers.

It was a happy time for them, perhaps the best time of their lives. She spoke of wanting to be a writer and read him short stories she had written. Gaudier spoke to her in English. They read Shakespeare's sonnets, discussed literature. They were both widely read. They were both often hungry and malnourished. Gaudier suffered frequent nosebleeds. His parents urged him to come home to rest and recuperate. Gaudier found a little cottage for Sophie near his parents' home and she came to the country. Gaudier called on her every day; his mother accused her of debauching him and making him ill. Soon, she said, the neighboring farmers would spread evil gossip and soon enough they did. One afternoon, while Gaudier was visiting, Sophie's landlord appeared, and on his heels the police, with an anonymous letter which accused her of being a prostitute. Disgusted, the pair returned to Paris and two months later left for England. It was 1910 and for the next four years, until Gaudier's death, they lived together under the name of Gaudier-Brzeska, as brother and sister.

Life in London was, in its daily struggle, not very different from Paris. Gaudier worked at office jobs on and off. Sophie found employment as a governess. They moved from one wretched room to another.

If you admired a drawing, it was yours

Gaudier met Haldane Macfall in 1912 and through him some of the literary and artistic luminaries of the day. His drawings were highly regarded. He didn't sell them. When someone admired one, he would give it away on the spot. Small sculptures he would sell when he could. He couldn't make larger pieces because he didn't have the money to buy stone. One night he and Nina Hamnett, the painter, stole a small piece of marble from a stonemason's yard, from which he carved the *Torso* of Nina, a nude inspired by Greek archaic inflections but invested with Gaudier's great gift of reflective imagination. That beautiful little piece is now in the collection of London's Tate Gallery (left).

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Musée National d'Art Moderne, Centre Georges Pompidou, Paris

Seated woman, completed in 1914, one of Gaudier's last works, expresses his "gentle order of feelings."

Tate Gallery

Redstone dancer, an experiment with abstract art, distressed Sophie, who worried that it wouldn't sell.

He had got into his stride by about this time. Working at odd jobs, translating, designing textiles, clerking, anything to earn enough to live on (never more than £6 or £7 a month), often hungry, moving from one slum dwelling to another, he was heart and soul and agile mind totally devoted to sculpture. His wide reading and intense study of museum collections burned in his consciousness and his work reflected all of this in a fury of creativity. Influences on his style appeared to range from archaic Greek to ancient Egyptian, to Chinese, to Oceanic and African. In his own era he admired the work of Rodin, Brancusi and Epstein, and he was not unaware of the efforts of the early Cubists, just then getting under way. What made Gaudier's work remarkable was the rightness of each piece, the perfection and the harmony, the compactness and the fluidity of it, all together spelling out the very essence of the art of sculpture.

His drawings, too, were immediately compelling. He had a line that sang and swooped like a swallow through crystalline air and, somehow, left an indelible trace behind. His sculptural studies, tiny pieces, of fawns, dogs, fish are entrancing and it is here that, as in Blake's grain of sand, an entire world is contained.

What he would have done, given stone and time, is unknowable, but no one of authority who has seen his work fails to use the inescapable adjective "great."

Happiest days in a mud-floored studio

For Ezra Pound, Gaudier was a "savant." Pound was delighted when Gaudier agreed to do the sculpture-portrait of him. "He was certainly the best company in the world, and some of my best days, the happiest and the most interesting, were spent in his uncomfortable mud-floored studio when he was doing my bust," he wrote.

Passing a cemetery on the bus route to Putney, where he had his studio under a railway arch, Gaudier one day damned the waste of good stone. He had intended doing the head in plaster, a "most detestable" medium to Pound, who got together the money for a half-ton block of marble. "At any rate," Pound wrote, "there was I on a shilling wooden chair in a not overheated studio with the railroad trains rushing overhead, and there was the half-ton block of marble on its stand, and bobbing about it was this head 'out of the renaissance,'" which was Gaudier. "I knew that if I had lived in the Quattrocento I should have had no finer moment, and no better craftsman to fill it. And it is not a common thing to know that one is drinking the cream of the ages."

Pound used sketches Gaudier made for the head on his stationery and the title pages of his books for the rest of his life. "The loss of Gaudier," wrote Emily

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Kettle's Yard Gallery, University of Cambridge

Wrestlers relief emphasizes the rhythm of movement of the sport. "I have never seen such a beautiful sight," he wrote to Sophie after his first bout. He found it "utterly incomprehensible."

Mitchell Wallace, the Pound scholar, "propelled Pound from his single-minded dedication to art to an obsessive interest in economics and the causes of wars. In a world in which the public barely has time for created art, Pound remained haunted by the sense of loss of the uncreated."

The sculptor Isamu Noguchi has made a copy of the head for a building he has designed as a memorial to Pound in Hailey, Idaho, where Pound was born. Henry Moore has acknowledged his debt to Gaudier and so has Barbara Hepworth. They were speaking of work done by a youth in his earliest 20s. The total lifetime cost of his materials, Pound estimated, "was perhaps fifty dollars worth of marble, and ten dollars worth of paper and ink. (I am here making a maximum estimate.)"

His entire career as a sculptor lasted only three years. In that brief time the only sizable piece of stone he had to work with was the one from which he made the *Hieratic Head of Ezra Pound.* A masterpiece, it is still owned by the Pound family.

When war broke out in 1914, Gaudier returned to France and volunteered for the army. He was a good soldier and quickly advanced to the rank of sergeant. He saw quite a bit of action, which he described in a bloodthirsty way in his letters home. But he also wrote his father, "I'm not at all bored in the trenches. A few days ago I did a small Maternity statue out of the butt-end of a German rifle, it's magnificent walnut wood and I managed to cut it quite successfully with an ordinary knife."

He was killed at about 1 o'clock in the afternoon of June 5, 1915, during the attack on Neuville-St. Vaast. He was 23.

After Sophie's death in 1925 the government took possession of her belongings, which included Gaudier's work—the sculptures, the drawings by the hundreds, the sketchbooks and his diary—in return for lodging her in a state asylum. Ede became aware of the collection in 1926 when "A great quantity of his work was dumped in my office at the Tate: it happened to be the Board room and the only place with a large table. . . . all this work had been sent to many art experts for their opinion, and London dealers had been asked to buy." No one was interested. "In the end I got a friend to buy three works for the Tate and three for the Contemporary Art Society, and the rest, for a song, I bought." Jim Ede is now 93 and living in Edinburgh, and he recalls that he bought the "whole material for about a third of my annual income. I think I was earning about £2 per week at that time."

Kettle's Yard today has 43 Gaudier sculptures, most of them on permanent view, of which 13 are casts. There are about 130 drawings, some sketchbooks and two etchings. When Ede took over Kettle's Yard—"four tiny condemned slum dwellings"—it was on the verge of being destroyed by the Cambridge city council. That was in 1957.

These days, if you are lucky enough to visit the gallery on a sunny autumn afternoon, it would seem that there is no more exquisite place in the world. You are surrounded by a sensibility so pure and so humane, so respectful and admiring of harmony and grace, so aware of proportion, shape, form, line and the relationship of things, that you begin to think, yet again, that maybe you know what art is. Certainly, you know what it is for.

The walls are white. The rooms are washed with yellow sunrays. There are crystal, pottery, drawings, paintings, sculpture, pebbles, dried roots and grasses, porcelain—and no clutter: a miracle. There is Gaudier's presence through his work, the absolute purity of what he did.

At the end of such a day it comes to you, the answer to what he might have done given time: he would have become an artist, you are certain, of the order of Picasso. He was that good as a boy.

Throughout the 1950s and '60s, Ede tried to place Gaudier's works with museums all over the world, and particularly in France. "The French were difficult," he recalled. "At first they refused to take any notice of Gaudier, who will one day be recognized as one of France's greatest sculptors. I offered to give them a lot of things for the museum and they wouldn't take them." At last France agreed to accept the gift. "If I could get together a roomful of things they would accept them . . . and so we were able to set up a room in 1965. . . . he now had a permanent room at the Beaubourg where we could take away all the works if they didn't behave rightly. For example, the room at the Beaubourg is smaller than the stipulated size. . . . But in time, as he becomes more recognized, I know they will give him more space. I felt it was senseless to worry about details when he was becoming famous." In fact, there is no Gaudier Room at Beaubourg (SMITHSONIAN, August 1977).

If you were to go there today—its full grand title is the Musée National d'Art Moderne, Centre Georges Pompidou—you would not find a single Gaudier on view. All of his work, given to France in honor of its native son, the sculptor Henri Gaudier-Brzeska, is in the cellar vaults, lying on shelves like sightless cadavers.

"Only those shut in the blind alley which culminates in the Victorian period," wrote Pound in 1918, "have failed to do justice to Gaudier. My praise of him is no longer regarded as an eccentricity.

"He is irreplaceable."

Beaubourg, are you listening?

Tate Gallery

Nina Hamnett posed for *Dancer* in 1913. Wrote Gaudier to Sophie, "Movement should come into art."

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By Dora Jane Hamblin

Behold the amazing, the spectacular, Giovanni Belzoni

A flamboyant strongman-turned-archaeologist revealed many Egyptian mysteries, including the tomb of Seti I and a temple at Abu Simbel

Museo Civico, Padua

Illustrious son of Padua, a self-assured Belzoni sat for romantic miniature now in city's museum.

The monster lay on its back. It was a reddish-brown color similar to the surrounding sand, and the man who had struggled up the Nile to find it looked down with a pleasure even he hadn't anticipated.

"I found it near the remains of its body and chair, with its face upwards, and apparently smiling on me, at the thought of being taken to England. . . . my expectations were exceeded by its beauty, but not by its size."

The year was 1816, the monster in the sand was the nine-foot-high head of "The Young Memnon," now a treasure of the British Museum's Egyptian collection, and the beholder was one of the most unlikely and most beguiling of early archaeologists in Egypt.

His name was Giovanni Battista (John the Baptist) Belzoni, son of a barber in Padua, Italy, and later a member of the Sadler's Wells Theatre in London, where he had made a modest stir playing giants and strongmen. That first day in 1816, using "fourteen poles . . . four ropes of palm leaves, and four rollers," which he had thoughtfully brought from Cairo, and scores of Egyptian laborers whom he managed to hire, he moved the giant head only "a few yards," and 50 yards on the next day, although "to make room for it to pass we had to break the bases of two columns."

His strongman training came in handy when the local kaimakam, or village bureaucrat, ordered the peasants not to report again for work. Belzoni rushed off bare-handed to confront the kaimakam, disarmed him of a sword and two pistols, and "gave him a good shaking." The workmen returned. A week later, "The Young Memnon" arrived at the banks of the Nile and months later on the banks of the Thames.

By today's standards Belzoni was fairly abrupt in his methods and a near-illiterate in specific knowledge, but he followed in the wake of generations of Carthaginians, Greeks, Romans and Byzantines who had gazed at ancient Egypt with awe and hadn't a clue as to what it was all about. Still, like his predecessors, he wanted to preserve and display the wonders. It was to be six more years before Jean François Champollion, the great code breaker, would decipher the Rosetta Stone and unlock the secrets of the language and of Egyptian history.

In Belzoni's case, as in Egypt's, it is perhaps best to start at the beginning. Belzoni was born on November 5, 1778. No shower of falling stars or any other phenomena attended his arrival, but he soon attracted attention: he grew to six feet six, a height that would make American basketball fans yawn, but that in 18th-century Italy made him a skyscraper. His father the barber may have been tall, but a contemporary biographer noted in 1826 that Giovanni's mother had been "a woman of majestic appearance."

If the boy was pointed at, taunted or simply bored with barbering, he showed an early penchant for adventure. He and a younger brother once sneaked off, headed for Rome, and got as far as Ferrara before little brother burst into tears and Giovanni had to take him home. That time it was a bit like Huck Finn taking off to see the world, but the next time it was serious.

After roughing up recalcitrant factotum, Giovanni recorded in watercolor 17-day journey of the colossal head of "Young Memnon" from Thebes to the Nile. A 17-month voyage took it to the British Museum.

Belzoni left for Rome at 16, with his parents' approval, to study hydraulics; he was to be supervised by a family friend who lived there. For a while he also toyed with the idea of becoming a priest, but Napoleon changed everything: having invaded northern Italy in 1797, he was moving south—and Giovanni was moving out. Maybe he hated Napoleon. Maybe he feared impressment into somebody's army. All he ever wrote was that the "state and troubles of Italy in 1800, which are too well known to require any comment from me, compelled me to leave it."

He went first to Paris, where he tried to sell holy objects, then to Holland where he went back to hydraulics, and finally, in 1803, to England. England became his second home, English his second language. He promptly wooed and won a plucky girl named Sarah, who would stick faithfully by his side, even in 124-degree heat, as he found and recorded the tombs and temples of Egypt. She probably deserved a medal.

Belzoni's first minor success in England was the construction of "water plays," using colored water to disport in jets and falls. When that sort of thing went out of vogue he traveled about the British Isles doing conjuring tricks and playing musical glasses by tapping on them. For a brief while he went abroad for the East India Company, but didn't like it. He went back to Britain, where he and his wife both took part in the tableaux vivants of biblical scenes, which were popular into the early years of this century even in the United States. Belzoni often starred as the "Patagonian Sampson" or as Goliath, and as a climax of some scenes he donned a specially constructed metal framework and carried up to 12 persons around the stage while waving a flag in each hand.

In 1814 he was in Sicily, headed for Constantinople with his act. But the first stop en route was the island of Malta. Malta marked the end of the Patagonian Sampson and the beginning of the Egyptologist. But not right away.

What happened in Malta was a chance encounter with an agent of the then Pasha of Egypt, who was an Albanian soldier of fortune called Mohammed Ali. Ali had risen from nowhere—like Belzoni himself. He had a dream of modernizing his adopted nation, and had sent an agent to the advanced countries of the north to find technicians. When Belzoni met the agent he remembered his hydraulics and quickly sketched a plan for a waterwheel that, he said, could revolutionize farming along the Nile. The agent was so impressed that he urged Belzoni to proceed immediately to Egypt. The Governor of Malta, the Right Honorable Sir Thomas Maitland, issued a passport to "John Belzoni and Sarah his wife—a British subject," which ensured their safe conduct from Malta to Alexandria. The document was dated May 9, 1815.

So far so good. Belzoni wrote later that the Pasha had accepted from Europe "the fabrication of gunpowder, the refining of sugar, the making of fine indigo . . . much to his advantage." But there was to be no waterwheel. Belzoni built and demonstrated a

Arabic scholar J. L. Burckhardt (left) and Henry Salt, the British consul, fired Belzoni's interest in Egypt.

At Royalty by the Tower theater, roars of approval met the "Patagonian Sampson" Belzoni, strolling around stage wearing 11 men on a 127-pound frame; reputedly he could carry 22. Act had trick effects, waterworks.

model "constructed on the principle of a crane with a walking wheel, in which a single ox by its own weight alone could effect as much as four oxen employed in the machines of the country." The day the Pasha came to see this invention, it performed as advertised, but Ali, bowing to the machinations of straw bosses who feared that the inevitable loss of jobs would lessen their political control, failed to adopt it.

Belzoni now was far from England, flat broke and stranded. Then came another chance encounter, this time with a man as exotic as Ali or Belzoni himself. He was Johann Ludwig (aka John Lewis and Jean Louis) Burckhardt, a Swiss romantic who had studied Arabic and Islam, and who dressed as an Arab and called himself Sheik Ibrahim. Thus disguised, he had explored widely in Egypt and the Middle East, where he discovered the "rose-red city" of Petra. Sheik Ibrahim regaled Belzoni with tales of a giant head lying in the sand near ancient Thebes and of a huge temple upriver. Among his other avid listeners was Henry Salt, the newly appointed English consul general, whose consular duties were light and who had been urged to collect antiquities, "whatever the expense," for "an enlightened nation."

The combination of personalities was magic. The former strongman, instructed by the fake sheik and supported by the fledgling consul, should direct his considerable energies upriver. Off he went and the rest, as they say, is history. After he found the giant head, Belzoni went farther south to find the "great temple," which he called Ybsambul—today's Abu Simbel, the magnificent monument moved in the 1960s to save it from rising waters behind the huge Aswan Dam. He duly noted it, then went to Karnak and Luxor, where he ran into the French again. Napoleon had been there, too, and although kicked out by the British, had left many a delegate. The French consul

general was a man named Bernardino Drovetti. He was as Italian as Belzoni, and he was as loyal to the French as Belzoni was to the British. He had built himself an aerie on top of the First Pylon, one of Karnak's monumental temple gateways, and from this height directed a squad of Egyptian workmen charged with digging up and carrying away anything they could find. Belzoni hired his own men—and an undeclared war was on. Because Drovetti seemed to have a lock on the temples, Belzoni turned to the tombs in the Valley of the Kings. He was the first Westerner to mount a large-scale exploration there, and in less than two weeks had found and entered four tombs, two of them—those of Ramses I and Seti I—so significant they would have made his reputation had he done nothing else.

His exploits have been somewhat dimmed by his methods, and perhaps most of all by his insouciance in reporting them: "Fortunately, I am destitute of the sense of smelling, [but] I could taste that the mummies were rather unpleasant to swallow. . . . I sought a resting place, found one, and contrived to sit; but when my weight bore on the body of an Egyptian, it crushed it like a bandbox . . . so that I sunk altogether among the broken mummies with a crash of bones, rags, and wooden cases, which raised such a dust as kept me motionless for a quarter of an hour."

Or, again, the unfortunate episode when the obelisk from Philae, another temple complex since moved from encroaching waters of the Aswan Dam, fell into the Nile. "The pier [we had built] appeared quite strong enough . . . but, alas, when the obelisk came gradually on from the sloping bank . . . the pier . . . and some of the men, took a slow movement, and majestically descended into the river. . . . For some minutes, I must confess, I remained as stiff as a post." Nonetheless, he rescued the obelisk, neither it nor the workers the worse for a dunking.

He went back to Abu Simbel with the grudging consent of his mentor, Henry Salt, who did not believe there was a temple there. Sheik Ibrahim had seen it, but it was Belzoni who excavated it, in 1817, and made precise drawings of its interior and exterior. When local peasants refused to help, he fast-talked some British tourists into helping him move several tons of sand from the vast complex.

Month after month, year after year, from 1815 to 1819, he plunged through the countryside cajoling, bribing, arguing, fighting the French and the fellahin, the bureaucracy and the climate.

He became a meticulous recorder of all he found, unlike many of his contemporaries. He made a wax model of the portico of the Isis temple on Philae, despite the fact that the "thermometer stood as high as 124 degrees of Fahrenheit in the shade; but the mercury had risen to the top of the glass, so that we could not judge what degree it would have reached had the tube been longer."

Under similar circumstances Belzoni camped out at

Gesturing grandly toward a colossal head, French consul Bernardino Drovetti stands amid collecting crew at Thebes. He also sold antiquities, and blew hot and cold toward Belzoni, whom he thought of as both an inferior and a rival.

Glazed earthenware servants attended pharaoh in afterlife; Belzoni found hundreds in Seti I's tomb.

the entrance to the Theban tomb of Seti I, while he and a Sienese doctor named Alessandro Ricci copied by candlelight all the painted bas-reliefs, the hieroglyphs and tomb ornaments. (The splendid sarcophagus was removed and sent to London.) It was so hot that dripping sweat often obliterated their watercolors, but they never gave up. Belzoni had acquired not only an English wife but also, on the evidence, a British stiff upper lip.

He needed it in what was to become one of his most famous exploits, the penetration of the Second Pyramid at Giza. The pyramids had been the subject of endless reports and theories, and Belzoni was not immune to their lure. He was intrigued also by acquaintance with a man he called Captain Cabillia. Cabillia must in fact have been an Italian seaman named Caviglia, who had descended into the well of the First Pyramid, uncovered the front of the Sphinx and discovered the little temple between the Sphinx's paws.

Belzoni, capitalizing on his experience in the Valley of the Kings, hunted for the "spots where the stony matter is not so compact as the surrounding mass; and . . . the concavity of the pyramid over the place where the entrance might have been expected to be found." After a couple of false starts, including a blind passage hacked by an early tomb robber who tried to force his way in, Belzoni found the right path. It was blocked by a portcullis stone, which had to be raised inches at a time. "After thirty days exertion I had the pleasure of finding myself in the way to the central chamber of one of the two great pyramids of Egypt."

When he finally got to the main burial chamber, "my torch, formed of a few wax candles, gave but a faint light." He found a ravaged sarcophagus with a broken lid, along with other clear evidence that the pyramid had been plundered centuries before.

Nevertheless, he was probably one of the first to state that the great stones of the pyramids "were not all taken from the east side of the Nile" but "have been cut out of the very rocks around the pyramids." And he noted, as researcher Mark Lehner did later (SMITHSONIAN, April 1986), "it appeared to me that the Sphinx, the temple, and the pyramid were all three erected at the same time, as they all appear to be in one line, and of equal antiquity."

Some of his other attributions were wildly inaccurate, but almost always for the right reasons. "The Young Memnon," for example, turned out to be in fact the head of Ramses II, but Belzoni couldn't have known it until the Rosetta Stone led to proper translation of the ancient inscriptions. To Belzoni,

In 1950, a guide in the Valley of the Kings showed "Belzoni's tomb" to the author; a recent exhibit of his work sent her off to renew the acquaintance.

As he entered the first large room in the temple of Ramses II at Abu Simbel, inveterate sketcher Belzoni came upon eight massive sculptures of the pharaoh (above), all armed with crook and flail. They stood before pillars on which were painted scenes with Ramses greeting gods of the Egyptian pantheon. Belzoni wrote that the colossal red granite head and torso he found at Karnak (right) was "of beautiful workmanship and uncommonly well preserved." Its head, ten feet from neck to top, was taller than that of Ramses but "not so bulky or heavy." Documenting his discoveries was always paramount, but he could not resist noting scenes such as the flooding of the Nile at Thebes (below).

The archaeologist even painted a false start in his search for entry to Khafre's Pyramid at Giza. Massive block behind torch slipped, barely missing a worker seated beneath it. An earlier entry seeker had made excavation.

Ramses II looked like a younger version of a nearby pair of colossal seated figures that were called the Colossi of Memnon.

Similarly, he misidentified the finest tomb he discovered and copied. Just as Heinrich Schliemann later took the *Iliad* as his source for locating lost Troy, Belzoni took the Bible, and the Greek historians Herodotus and Diodorus, as his guides to the ancient world. After he found the magnificent tomb of Seti I, the father of Ramses II, he copied the inscriptions and sent them off to a British scholar named Thomas Young, who was then attempting his own translation of the Rosetta Stone. Young told him the hieroglyphs referred to the pharaohs Necho II (ruled 610-595 B.C.) and his son Psamtik (or Psammetichus) II (595-589 B.C.). Not until Champollion broke the code could scholars recognize the stunning tomb as that of Seti, 700 years before Psamtik. For more than a century this splendid find was known as "Belzoni's tomb" and it is thus frequently described even today.

After all these triumphs, Belzoni made a perilous exploratory trip across the desert to find the fabled city of Berenice on the Red Sea, where trade goods from India and Persia once were unloaded to go overland to the Mediterranean, to the Nile and beyond. He found it, and then late in 1819 set sail for Britain. Worn out from hard work, recurrent illnesses and constant battles with warring antiquities hunters, he wanted to publish a book about his adventures. He visited his family in Padua and saw the two fine black diorite statues of the lion-headed goddess Sakhmet (opposite) he had sent as a gift to the city—which reciprocated by striking a medal in his honor. London's John Murray published Belzoni's tome titled *Narrative of the Operations and Recent Discoveries within the Pyramids, Temples, Tombs and Excavations, in Egypt and Nubia; and of a Journey to the Coast of the Red Sea, in Search of the Ancient Berenice; and Another to the Oasis of Jupiter Ammon.* Accompanied by a folio of his watercolors, it was an instant success and was translated into French, Italian and German.

Nowhere in his book does he refer to his strongman days. But the wanderlust had never deserted him. Belzoni ran away once again, in 1823, back to Africa—but this time not to Egypt. He wanted to explore the course of the Niger River. After trekking to Fez, to Gibraltar, to Madeira and finally to Tenerife, he embarked on a coastal steamer and wrote his last letter home to the faithful Sarah. He died in Gwato on the Benin River on December 3, 1823, age 45, of what was diagnosed as dysentery but must also have been exhaustion.

The museum on whose behalf he labored so long and so hard gives him short shrift today. In the Egyptian wing, the famous head is attributed as "gift of J.L.

Burckhardt and H. Salt, 1817." The only specific reference to Belzoni was—until recently—an inaccurate credit on a red granite sarcophagus lid of "Setau, 1230 B.C. Thebes . . . . Removed from the tomb by Giuseppe Belzoni in 1817."

Others have been kinder. In his own day Piccadilly's Egyptian Hall mounted a gigantic exhibition on two floors that drew 1,900 first-day visitors and an approving press (SMITHSONIAN, April 1978). *The Times* noted that his "sagacity and success in discovering the subject matter of this extraordinary exhibition has distinguished him above all European travelers in modern times." There were two full-size re-creations, glowing with color, of the grandest chambers in Seti I's tomb and a 50-foot, one-sixth scale model that visitors could stroll through from entrance to burial vault. There were sculptures of pharaohs, deities, eerie monsters—even the mummy that Belzoni, ever the showman, had unwrapped in the presence of a gaggle of physicians. To a public on the threshold of a love affair with things Egyptian, it was just the ticket.

In our century Howard Carter, who found and, with Lord Carnarvon, opened the famous tomb of Tut, wrote that Belzoni's had been the first grand-scale excavations in the Valley of the Kings and to him went "full credit for the manner in which they were carried out."

Who Was Who in Egyptology, published by the Egypt Exploration Society in London, noted that Belzoni "cannot be judged by the standards of later excavators . . . but must be seen in the context of the period before decipherment; at the start of his career he was neither better nor worse than other contemporary figures, but he later evolved techniques for his work and acquired knowledge that raised him above the general level."

Big Giovanni himself, apologizing for his English, declared: "I am not an Englishman, but I prefer that my readers should receive from myself, as well as I am able to describe them, an account of my proceedings in Egypt. . . . If I am intelligible, it is all that I can expect."

Perhaps he wrote his own epitaph in a description of the great tomb of Seti: "I may call this a fortunate day, one of the best perhaps of my life: I do not mean to say that fortune has made me rich, for I do not consider all rich men fortunate; but she has given me that satisfaction, that extreme pleasure, which wealth cannot purchase; the pleasure of discovering what has been long sought in vain, and of presenting the world with a new and perfect monument of Egyptian antiquity."

As they would say in Padua, *"Bravo, Giovanni."*

Museo Civico, Padua

This diorite sculpture of Sakhmet, Goddess of War and Eye of the Sun God, was a Belzoni gift to Padua.

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In 1897, well-dressed zoology students examined the catch from a net hauled out of Quisset Harbor. Woman in flat hat at center is Gertrude Stein. She was there for summer, preparing for medical school.

By James Shreeve

A world center of basic biology celebrates a first century by the sea

Heretical in its setup, the Marine Biological Laboratory is where some of the most fundamental questions of life are answered

This month marks the 101st occurrence of one of the strangest phenomena in natural science: the annual migration of scientists to the Marine Biological Laboratory (MBL) in Woods Hole, Massachusetts. They will come by the hundreds, from the best universities on the East and West coasts, and from such notoriously landlocked localities as Kansas and Switzerland. They will be greeted by another 150 colleagues who, contrary to tradition, work at the MBL all year.

Curiously, not one in this pilgrimage will be a marine biologist. Unlike their neighbors at the Woods Hole Oceanographic Institution or the National Marine Fisheries Service down the street, few MBL scientists go down to the sea in ships. For the most part they are content to navigate the world circumscribed by a cell membrane. What they seek are answers to the fundamental questions of life—how nerves send their messages, what makes a cell divide, by what power it divines its role in the organism and knows to organize itself accordingly. Solid, sound, mainstream biology, nothing fishy about it. Except that here in Woods Hole, the sea holds all the answers.

6:30 A.M. A day in late summer, 1987. Low tide. At first glance Woods Hole seems like an ordinary Cape Cod village: a pleasing clutter of shingle and clapboard

Marine Biological Laboratory buildings dominate this view of Woods Hole, Massachusetts. In Eel Pond at lower right, the two relatively large fishing boats tied up at the dock are the MBL's collecting vessels.

Photographs by Richard Howard

Stephen Mills makes sure seawater moves to where it is needed from these fiberglass tanks on the roof.

wedged between the sea and a salt pond. Sailboats pull at their mooring lines. Chowdery restaurants wait for the day's tourists.

But look again: uncharming brick laboratory buildings have muscled room for themselves on Water Street. In Eel Pond behind the village, a discarded plastic test tube lies on a mat of seaweed exposed by the tide. On the opposite bank of the pond, two bells hang in a church tower. The larger one has been inscribed with the name Mendel, the Austrian monk who first set forth the laws of heredity. The smaller bell is called Pasteur.

The silence of the morning is broken by the sound of a boat engine. The *Gemma*, a trim, 50-foot fishing trawler owned by the MBL, pulls away from her dock.

7:30 A.M. John Valois, the man responsible for providing the MBL with research specimens, enters a wood-frame building leaning into Eel Pond. Inside, the ground floor is given over to tanks and trays filled with dark clusters of life. John gives a quick tour. He leads us first to a long fiberglass tank full of horseshoe crabs—dull brown domes piled up on one another. John snatches one up by its tail and flips it over on its back. We see that the drabness is only shell-deep; underneath, the crab is a commotion of louvered gills and squirming appendages. Cradling the animal in his hand, John explains its contributions to biomedicine: research on horseshoe crabs has yielded a Nobel Prize-winning elucidation of the chemistry of vision as well as the discovery of a substance in the animal's blood that can detect toxins in human blood (SMITHSONIAN, April 1975).

We pause next to stare down at a tankful of lower-echelon demons—toadfish, surly and brooding, enlisted here toward the study of insulin metabolism. Nearby, a basin bristles with sea urchins. The gametes—eggs and sperm—of this animal have instructed generations of developmental biologists on the miracles of fertilization, cell division, and embryonic development (along the way, illuminating the possible causes of some cancers, birth defects and other abnormalities of cellular growth). Every organism in the room, from the jellylike sea squirt to the dogfish circling in its tank, offers the scientists some special insight into processes common to all animal life, but revealed with a serendipitous simplicity.

John leans over a large circular tub. His hand shoots in and reappears holding a slippery, freckled tube, a tangle of tentacles and two huge, depthless eyes. Though a sad specimen, it can still serve as a prop for John to explain why neurobiologists suggest that the long-finned squid deserves its own Nobel Prize.

"Two very thick nerve fibers, or axons, run down the sides of the squid's mantle," John explains. "These fibers coordinate a system of muscles that enable the animal to shoot water through a siphon under its beak, propelling it through the water like a torpedo. But it's the axons themselves, not the squid's behavior, that bring the biologists here. Fifty years ago J. Z. Young discovered the axons. He was the first to penetrate one with a tiny electrode to measure the electrical transmission of nerve impulses. Much of what we've learned since then about our own nervous system comes from work on this animal."

Upstairs, Valois peruses the messages on his desk. As director of marine resources, his job demands not only an understanding of the needs of lowly marine species,

Tim Armstrong (left) and Jamie Capobianco wrestle tubs of live squid up the dock from collecting boat.

Marine resources director John Valois holds up three of the long-finned squid central to MBL research.

but an expert's appreciation of the capricious dispositions of large-brained biologists, too. Lately, a conflict has developed over the distribution of squid. Most of the neurobiologists here need only six or eight healthy specimens a day. A few labs, however, are following lines of research that require dozens daily, albeit small ones. As is common this time of year, the squid schools have begun to move farther offshore, making it much harder for the *Gemma*'s crew to fill all the scientists' orders. Yesterday John learned that the squid supply had come up short and at least one lab had had to bring a promising line of work to a standstill. Today he will arrange to stagger the days on which labs pick up their squid so that one will not inadvertently take too many and leave another with nothing to work on.

8:40 A.M. Dressed in high-waters, flannel shirt and a red cap, Stephen Mills leans over a dock, checking a length of filter pipe for fouling. Steve's job is to keep the ocean circulating through the body of the MBL: 500 gallons of seawater per minute, sucked from Great Harbor and delivered to nine fiberglass tanks on the roof of Lillie, the main laboratory building. From there the water flows continuously by gravity to every lab on the campus that works with live animals. From behind every door comes the sound of water trickling into trays and tanks, a rustic babbling that at first seems out of place among the centrifuges and scintillation counters.

There are two places at the MBL that the ocean doesn't reach. The first is the Ecosystems Center, a thriving group of ecologists studying the life processes not of single organisms, but of whole communities of organisms interacting in environments as far-flung as a tundra lake in Alaska and a rain forest in Brazil. The second oceanless interior is the MBL library, which dominates one wing of the F. R. Lillie Building. The library houses nearly 200,000 books, but its real value is the acreage of journal pages waiting in the stacks. The MBL subscribes to some 3,000 scientific publications in 40 languages, which makes it one of the best-informed institutions of its size anywhere in the world. The library is open 24 hours a day, 365 days a year. This summer, 135 scientists are at the MBL solely to use these resources. For a monthly fee they are provided with a scholar's bliss: a desk, a chair and a yellow cone of light.

Over a doorway, a framed placard bears the incongruous inscription, "Study Nature, Not Books." This is a relic from the origins of the MBL, an admonishment by the great Swiss-American naturalist Louis Agassiz to his students. In 1873 Agassiz opened a "seaside school of natural history" on Penikese Island, one in a stepping-stone path of islets leading away to the southwest of Woods Hole. When Agassiz died

James Shreeve wrote the companion book for public television's Nature *series. He is now working with Donald Johanson on a book about human evolution.*

later that year, however, the project soon fizzled.

Woods Hole itself actually had a marine laboratory already. In 1871 Spencer F. Baird, then Assistant Secretary of the Smithsonian Institution, had set up there the first headquarters of the U.S. Fish Commission (now the National Marine Fisheries Service). He hoped to transform the place from a tiny Cape Cod village to a tiny Cape Cod village overrun by scientists. The location was ideal. Like Penikese, but without its impractical isolation, Woods Hole lay at the confluence of two great ocean currents: the Gulf Stream, carrying a diversity of marine organisms from the south, and the cool Labrador Current swirling down off the Cape from the north, bringing its own cast of cold-water characters.

The start: 17 biologists and a rowboat

Eight years later Alpheus Hyatt, one of Agassiz's students, established a marine science school in Annisquam on Cape Ann, north of Boston. Baird, by then Secretary of the Smithsonian, persuaded Hyatt and his wealthy backers to establish a more permanent marine laboratory in Woods Hole instead. With Charles Otis Whitman as director (another of Agassiz's heirs from Penikese), the Marine Biological Laboratory opened its doors in July 1888. There was neither a library nor accommodations, and only a rowboat for collecting specimens. With the help of the workers at the Fish Commission, however, the 17 participants put together a functioning laboratory. Then, in August, they packed up their microscopes and left, establishing a life cycle for the MBL organism that has continued through most of its subsequent history. Right up until the mid-1970s, when year-round research became an entrenched part of its character, the MBL did not so much exist as perennially reinvent itself in spring.

That such an unlikely biological Brigadoon not only survived but grew to become what Lewis Thomas has called our "National Biological Laboratory" can be attributed in large part to the institutional heresies conceived by Whitman and his colleagues. "Every man comes to the MBL with his own subject and does what he pleases with his work," a later director declared on the tenth anniversary of the lab. There is still no official plan of research. There is no tenure, no promotion, no dean, no hierarchy.

9:15 A.M. Pale and puffy-eyed, Bob Silver arrives late to his door in the Whitman Laboratory, a four-story rabbit warren housing primarily summer scientists. He is recovering from a "real heavy weekend"—five full experiments run start to finish. An investigator from the University of Wisconsin, Silver shares the lab with two others, but spends most of his time alone in a dark, inhospitable wedge of space behind double doors in the back. A noisy air conditioner keeps the room at 50

Graduate student Diane Cowan records courtship of lobsters inside an artificial shelter in the aquarium.

Susan Gilbert and Roger Sloboda cut the heads from 300 squid to extract the protein they are studying.

With an old gooseneck lamp for a "full moon," Sally Gewalt and Barbara Foster fish for clam worms.

She then releases them on the bottom of Buzzards Bay. Squid, crabs and a sponge share space in the tank.

degrees F. He has taped heavy canvas over a window that commands a view of blue water that would make a realtor drool.

The cold is for the benefit of the eggs, sperm and embryos of the sand dollar, which grow listless and eventually die in balmier temperatures. Bob explains that the eggs are large and transparent, and can be easily fertilized to begin development. As such they make ideal helpmates for understanding mitosis—the process by which a cell's nucleus divides and distributes its chromosomes to two new nuclei. The cell itself then splits in two: life. Silver believes that the cycle of a cell is regulated by a "clock" that tells it when to initiate mitosis, when to assemble the spindle-shaped array of fibers that will pull the chromosomes apart and when to cleave. The normal maintenance of life demands fantastically precise timekeeping in cell replication; in this metaphor, cancer becomes a fast-paced clock that constantly rewinds itself.

Silver's point of attack is the critical part played by calcium ions in initiating each tick of the cell's clock. Biologists today believe that the release of calcium ions acts as a spark setting off a host of crucial events within cells, including mitosis, fertilization, muscle contraction, the transmission of nerve impulses and even the changes in nerve cells that occur as an animal learns. But its importance was not always recognized. Half a century ago at the MBL, the notion was put forward insistently by an iconoclastic physiologist named Victor Heilbrunn. He could win few converts.

"He was literally laughed off the stage of the Lillie Auditorium," Bob says. For years after his death in 1959, a plaque hung to commemorate Heilbrunn's contributions gathered dust in an MBL back stairwell. In 1987 the plaque was quietly moved to the main lobby wall, to join those of such past distinguished MBL scientists as Jacques Loeb, Frank Lillie and Thomas Hunt Morgan.

Pregnant or not, the work goes on

11:10 A.M. Back in the Whitman Laboratory, Bob Silver introduces us to his two labmates, Roger Sloboda from Dartmouth and Susan Gilbert from Penn State. "It's easy to tell us apart," says Roger. "I'm the one who's wearing a hat. Susan's the one who's pregnant."

Roger's hat, the long-billed nautical type, pushes his curly hair out over his ears. Susan's pregnancy, the seven-month type, is worn as if it is very much beside the point. She grudgingly admits that her days are "a little less focused" this summer than last. Still, the work they are doing often demands attention from 8 in the morning to 11 at night.

Noon. As the day wears on, a hundred experiments slowly shed their data. Not all the progress takes place

For Diane Holmstrom, scarce space means hunching in the hall; Fraser Shilling eases shoulder cramps.

Worm-egg results are studied by Donna Beer, looking through microscope, Chiara Motta and Karin Sturm.

in the dark little rooms. All over the campus, the scientists congregate in small groups in stairwells and on lawns, or wander up to the coffee machine in the library to see who else has wandered up. Then the talk starts. You can hear it everywhere—on street corners, in the mailroom, in local restaurants—people talking about the work, spinning out ideas. Talk is the essence of the MBL; its whole illustrious history might be seen as one long inspired conversation.

In the Lillie Auditorium, full-time investigator Shinya Inoué presents his latest findings on the dynamics of the mitotic spindle. The audience sees a filigree of threadlike structures dancing on a projection screen eight feet across. Each of these filaments is really only one four-thousandth the width of a hair. Their random touchings, never before observed, may explain how a spindle fiber can be both fluid and stable at the same time.

"Visualizing images of structures this small was thought to be beyond the level of theoretical possibility," Inoué mentions, almost as an aside. In the glow from the screen, the faces in the darkened auditorium remain impassive; they are used to seeing him return, pictures in hand, from the other side of the possible.

Pennies for Confucius—and positive results

2:10 P.M. A statue of Confucius sits at the end of a corridor in the Lillie Building. Tradition has it that a penny placed in the hand of the sage will bring luck to your experiments; displease him, and your data will be published only in *The Journal of Negative Results.* This afternoon, five coins rest in Confucius' palm. The scientists just put them there for the neighborhood children. Or at least that's what they will tell you.

Over in the embryology course lab, Sally Gewalt peers into her microscope, taking notes. At the next bench over, Chiara Motta, from the University of Naples, holds a sheet of polyacrylamide gels to a light. Two other students look over her shoulder: Donna Beer, from the University of Massachusetts, and Karin Sturm, from West Germany by way of the Linus Pauling Institute in California. Only a couple of days remain of the time allotted for their joint research project. The three students hope that the pattern of dark bands on the sheet will conform to their expectations. It doesn't.

Not all the work going on in this room has the high-tech sheen of modern molecular science. At her bench, Sally Gewalt dyes the living eggs of *Nereis,* a clam worm, with an ink used for centuries in Japanese calligraphy. Seventy five years ago, another MBL student named Ernest Everett Just performed much the same motions, attempting to find out whether the first cleavage of a fertilized egg extends from the point where the one successful sperm pierced its membrane.

For Bill Demby, the difference means getting another shot.

When Bill Demby was in Vietnam, he used to dream of coming home and playing a little basketball with the guys.

A dream that all but died when he lost both his legs to a Viet Cong rocket.

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Talk is a primary activity, here between John P. Trinkaus of Yale (left) and Brian Salzberg of Penn.

His peers credit Shinya Inoué with "reinventing" light microscopy; cell divides on screens behind him.

A student of former MBL director Frank Lillie, Just would later become one of the first black Americans to be recognized for scientific achievement.

3:05 P.M. The *Gemma* returns with enough squid for all takers. John Valois comes down to oversee the operation. A crew transfers the catch from the boat to holding tanks.

Roger Sloboda and Susan Gilbert wait until the rush is over, then scoop smaller specimens into a bucket. For a single preparation of the protein used in their studies, they will need the optic lobes of about 300 squid. Roger dons an ink-stained lab coat over his shorts and T-shirt; he squats on the floor and begins to snip off squid heads with a pair of scissors. Susan doesn't have to squat. Without making a big deal about it, the staff of the supply house has given her a stool, perfect for pregnant squid-cutters.

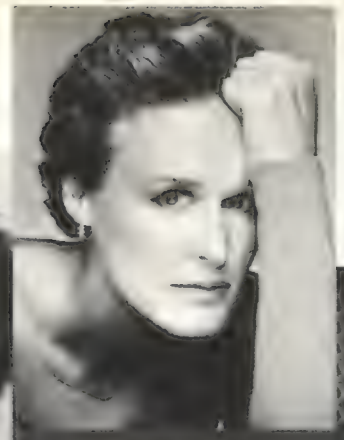
Though you wouldn't know it to look at them, these investigators are embroiled in a bitter controversy. What has come to be called the "motor wars" surrounds one of the most important advances in cell biology in this decade. Along with several other MBL labs, Roger and Susan's has spent the past few summers searching for the key to a phenomenon called intracellular transport. Inside virtually all cells, a network of microscopic "tracks" carries a steady two-way traffic of vesicles filled with nutrients and other cargo needed to keep the cell functioning. In some major illnesses such as Alzheimer's disease and Lou Gehrig's disease (amyotrophic lateral sclerosis), this transportation system breaks down.

For research biologists like Roger and Susan, however, the clinical application of what they might learn is only a distant incentive. What drives them forward is the utter newness of this system, a form of molecular interaction never before encountered. Understanding intracellular transport—especially the form called fast axonal transport, studied in nerve cells—could shed light on a whole range of other biological mysteries.

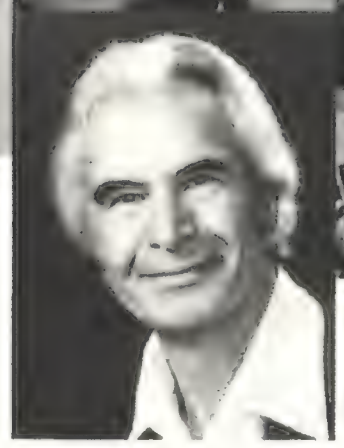
For years fast axonal transport was the relatively lonely obsession of Ray Lasek, an MBL investigator from Case Western Reserve University in Cleveland. Then Robert Allen of Dartmouth College, while teaching an MBL course in 1981, stumbled upon a way to improve his microscope's visualizing power by hooking up a video camera. Allen and his colleagues trained their enhanced microscope on a number of previously murky cellular matters—including axonal transport in the squid. To their amazement, the traffic of vesicles to and fro appeared as clear as a highway viewed from a helicopter window. Allen invited Ray Lasek up for a look.

Joe Williams

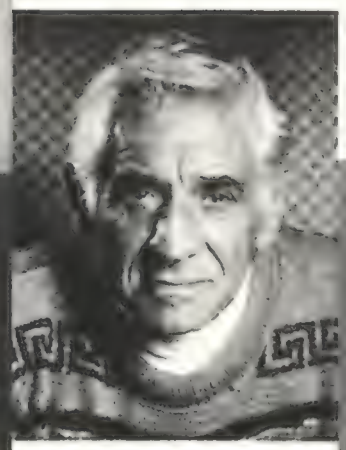
Liza Minnelli



Glenn Close



Dave Brubeck



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In Great Sippewissett Marsh, Carol Reitsma and Ivan Valiela count all species of grass within a quadrat.

"It was the greatest experience of my life," Lasek says. "I knew the movement was there all along, but it was something I could only visualize in my dreams." In true MBL spirit, Allen's group invited Lasek to join them in the announcement of the discovery.

Several other labs entered the race to identify the molecular "motor" driving the mysterious motion. By the summer of 1983 the "tracks" carrying the vesicles had been identified as microtubules, miniature pipelines. Then, in 1985, members of an MBL lab headed by National Institutes of Health neurobiologist Tom Reese announced that they had found the prize. Reese's group had isolated a protein, dubbed kinesin, that seemed to be responsible for the *outbound* traffic of vesicles. In the field at large the discovery was hailed as a breakthrough, but at the MBL, where the competition had been keenest, kinesin caused some bitter feelings. Some people accused the Reese group of failing to give proper credit to the work of other labs, or attributed its success to superior funding. There were even threats of lawsuits over results alleged to have been improperly obtained. What had begun as a model for the kind of cooperation that the place was famous for had deteriorated into closemouthed hostility.

"There may have been some legitimate gripes," says Roger. "But nobody can deny that Reese's group contributed something extremely important."

Recently it has become clear that the race to understand axonal transport is far from over with the discovery of kinesin. Roger and Susan believe that the definitive experiment has yet to be done that proves kinesin to be the sole force behind the outbound movement of particles in the cell. Meanwhile, they suspect their own protein is responsible for the *inbound* cellular traffic. They call the protein simply "292," which refers to its molecular weight.

"We haven't amassed enough ego in the lab yet to give it a name," Roger laughs. (It has since been named vesikin.) In the meantime, neither allows the competitive atmosphere to interfere with healthy collaboration. This evening, Susan has an appointment to check some results with Bruce Schnapp, a key member of the Reese group.

5:20 P.M. For microbiologist Harlyn Halvorson, this summer's research has a particular urgency. In September, he will become director of the Marine Biological Laboratory, a job notoriously stingy on research time. It will be his responsibility to urge an institution conceived in the last century forward into the next. Halvorson leaves no doubt about the direction he believes the MBL must take.

"If the science that we do here is going to be relevant, we have to build up the year-round programs and supply the facilities for genetic engineering," Halvorson says. "We've got to be able to synthesize proteins, isolate genes, clone genes and apply the techniques of modern molecular biology. If we can't do that, we're finished."

Few scientists really dispute whether the MBL should expand its capabilities in this direction. But genetic studies demand that you develop strains of animals whose genetic background can be pinned down. This is easy enough to accomplish with yeasts or bacteria reproducing in a petri dish, but impossible with free-living squid caught off the stern of a fishing boat. What's needed is a facility where marine organisms can be raised in a controlled environment, their genes managed through generations. The Marine Resources Center that Halvorson envisions would also lessen the MBL's utter dependence on the sea.

Can MBL raise the money to stay on top?

"A single ecological disaster could wipe out the squid," Halvorson points out. "Then what happens to our neurobiology?"

The Marine Resources Center might be part of the answer, but another question quickly follows: Who pays for it? The days are long gone when MBL director Frank Lillie, married into a wealthy family, could sit down at his desk at the end of the summer and write out a check equal to the MBL deficit. Run by scientists who were rarely so affluent themselves—and not always sensitive to budgetary realities—the MBL has a tradi-

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The quote isn't accurate. But the numbers are.

In the last Presidential election, only 53% of those eligible actually voted.

The problem is worst among the youngest voters, the 18-to-24-year-old group. Less than half of them even register. Only 17% actually voted in 1986.

This shocking statistic prompted us to make a commitment to the Vote America Project.

Together, we are providing teaching materials to 25,000 high schools. And personal registration and voting booklets to over a half-million voting-age students. Our goal: to register every one of them. And to urge them all to become informed voters.

We're running a national TV campaign to encourage older voters, too.

Because when a government is *of* half the people and *by* half the people, sooner or later the worst thing happens. It becomes *for* half the people.

And no American would vote for that.

GENERAL DYNAMICS
A Strong Company For A Strong Country

Researcher applies seawater and Japanese calligraphy ink to clam-worm eggs and sperm in a slide well.

tion of seat-of-the-pants financing that has reduced more than one comptroller to tears. Halvorson was hired not only for his popularity with the other scientists but for his proven abilities as a fundraiser. But he will need to raise at least $19 million in construction costs alone, in an era when funding for science is desperately scarce. Is there a possibility that the MBL will not survive into the next century? Halvorson smiles.

"Survival isn't interesting," he says. "Leadership is."

7:30 P.M. The evening ripens, growing warmer as the breeze dies. Inside the MBL organism, the work goes on. Somewhere in Whitman the isolated nerve cell of a squid fires a signal. The senseless message is shunted through $100,000 worth of electronics and reemerges, loaded with meaning. In the next room, a graduate student shakes some sea urchin eggs in a solution to remove their outer membranes, then carries on with the prep. It's all routine: the pipetting, the squinting over measurements, the cranks on the hand centrifuge turned through a hundred Woods Hole summers. But each time must be perfect. Each new experiment is the one that matters.

8:20 P.M. Susan Gilbert crosses the courtyard to the "rival" lab in the Loeb building, carrying protein 292 in a test tube. Bruce Schnapp readies an experiment for her arrival.

Roger Sloboda is home with his family in their cottage. After his 8-year-old daughter is tucked in, he steals back to the lab and works another couple of hours, "just until the protein is happy to sit in the fridge overnight." Susan and Bruce are hard at work, testing whether protein 292 will prompt microscopic glass beads to move along isolated microtubules. Bruce thinks they do; Susan's not so sure. They try some refinements.

Hunting clam worms with a gooseneck lamp

10 P.M. Sally Gewalt leans over the dock behind the supply house, her collecting net poised over the circle of light cast on the water by an old-fashioned gooseneck lamp. (From a clam worm's perspective, it could just as well be the moon.) An eel slides through the warm yellow lamplight. Suddenly a male *Nereis* swims into view. Seeming disoriented by the light, the little worm twists and gyrates across the surface until Sally scoops him up with the net. Ten minutes later a female makes an imperial appearance: whitish, many-legged, several times larger than the male. Netted, her wrigglings suggest indignation.

At the beginning of a new century of MBL science, tradition is not something hung in a gilded frame or extolled in a commemorative address. This evening, the past is something momentarily alive, captured in the beam from a battered old desk lamp. You can find

it too in the lights of the MBL library above, silhouetting the scientists as they search the pages for a few last clues before heading home. Viewed from the dock, they seem like black ghosts moving through the stacks.

Midnight. You can even find tradition in the willowy glow caught under a microscope in the physiology course lab, where two students work through the night. Using fluorescent antibodies, they trace the shape of cell structures unknown to their counterparts just a couple of summers ago. Tonight the students are fired up by some insight. Next year, or the one after that, somebody else may prove them wrong, using a technique they cannot yet imagine. It doesn't matter. The tradition is the constancy of discovery itself, the act of illumination cutting a little deeper into the dark.

3:30 A.M. The two students return to their dorm rooms and collapse. For a few hours the MBL is left to the organisms alone, their spines and tentacles prickling with sensation as the ocean passes by in their seawater trays. Tomorrow these animals will give up their gametes, membranes and plasms for the sake of science; tonight their biology simply keeps them alive. Somewhere in the dark, a drainpipe empties seawater into Eel Pond, a sound like a hundred braided voices, whispering the answers to all the questions ever asked here of the sea.

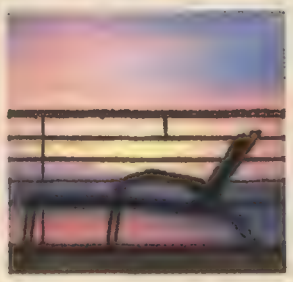
Bob Silver heads back from tip of breakwater where he has returned sand dollars to their home in the sea. Sunset means it was a short day for him; this is a ceremony he usually conducts closer to midnight.

BRISBANE SEATTLE VICTORIA VANCOUVER KETCHIKAN JUNEAU SITKA SKAGWAY HAINES GLACIER BAY NEWPORT MADANG GUADALCAN

BOSTON SYDNEY HOBART MELBOURNE AUCKLAND WELLINGTON HONG KONG REYKJAVIK SHANGHAI BEIJING DALIAN INLAND SEA NAGASAKI LENINGRAD PUSAN KOBE HAKODATE

Sky

INTRODUCING THE ROYAL VIKING SUN.



She will be one-third larger than our other already spacious ships, yet will host only four percent more passengers.

Her cozy Oak Room will feature cocktails beside the only wood-burning fireplace afloat.

Naturally, she will continue in the Royal Viking traditions of five-star cuisine and unsurpassable service.

Sea

BAR HARBOR SAGUENAY RIVER QUEBEC BARCELONA NAPLES VENICE ROME STOCKHOLM JAYPURA BORDEAUX ANTWERP AMSTERDAM

Bahamian Registry

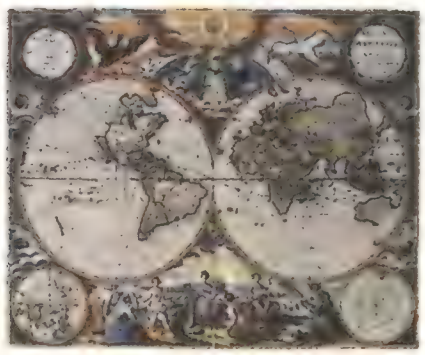
HONOLULU BORA BORA LISBON SINGAPORE MANILA CEBU SANDAKAN BRUNEI ZHANJIANG PENANG PORT KELANG MARTINIQUE RABAUL

RIO DE JANEIRO MONTREAL MAZATLAN ACAPULCO PANAMA CANAL BANGKOK SAN JUAN ST THOMAS ANTIGUA GRENADA TRINIDAD DEVIL'S ISLAND TOKYO DUBROVNIK BRIDGETOWN

MBURG PLYMOUTH ST NAZAIRE COPENHAGEN HELSINKI OSLO GATUN LAKE CORFU CALDERA SAN BLAS ISLANDS PICTON BAY OF ISLANDS

Star

THE SHIP THIS CENTURY WILL BE REMEMBERED FOR.



Like the great superliners of the twenties and thirties, she will be built for comfort and beauty, out of materials like brass, mahogany, and teak. She will be decorated with hundreds of pieces of original art. And while her Main Dining Rooms can accommodate all passengers at one time, she will nonetheless have a supper club that accepts reservations for more intimate dining.

Yet, in her meticulous engineering and design, she will incorporate features unimaginable in the great liners of the past. Each of the ship's staterooms will be equipped with a television and video player, a refrigerator, a bar, and a spacious walk-in closet. Nearly 95 per cent of these rooms will be located on the outside of the ship. And almost 40 per cent will have private verandas–more than any other passenger ship ever built.

Her name is the Royal Viking Sun. And after a brief Inaugural Christmas Cruise beginning on December 16 in Ft. Lauderdale, she will slip through San Francisco's Golden Gate on January 8, 1989, to begin a 100-day Inaugural World Cruise to 33 magnificent ports.

Limited space, however, dictates that only a select few may share in the memory of our inaugural voyages. To secure your stateroom, please contact your travel agent. Or call (800) 426-0821 for the Inaugural World Cruise brochure, along with a copy of our colorful 1989 Cruise Atlas. We look forward to seeing you on board.

ROYAL VIKING LINE

Sun

In a cartoon on an 1891 cover of *Puck*, shutterbugs labeled the "Peeping Toms of the Camera" produced a negative reaction at the beach. A newspaper of the day alleged that Kodaks were a "terror" at picnics, too.

By Richard Conniff

When 'fiends' pressed the button, there was nowhere to hide

The first genuinely foolproof system for taking a snapshot was introduced a century ago. We've been posing (and preyed on) ever since

Sometime around 1890, a man whose identity we do not know wrote to his sister in Chicago that he was homesick. Her reply was charming and to the point: she sent him a snapshot of his fireside slippers.

That gesture was utterly characteristic of the day. The camera had only recently come into the hands of ordinary people in the form of a point-and-shoot box called the Kodak. Introduced 100 years ago this month, the Kodak was not just a camera. It was part of the first foolproof system for taking pictures, aptly described in one of the most successful advertising slogans ever: "You press the button, we do the rest." It came already loaded with film and after you shot 100 frames you packed the camera in a box and mailed it to Rochester, New York, where somebody else did the processing and reloading.

Suddenly, picture taking no longer required dabbling in glass plates and noxious chemicals, nor did it require a wheelbarrow-load of equipment. And cameras for the first time became playthings for everyone from the middle-class schoolboy to the Princess of Wales. The snapshot had arrived, and for a giddy moment the Western world went shutter-mad.

Photographers, who were also known as "Kodakers" and "photo fiends," "multiplied as the grasshopper," in the words of one journal. They snapped pictures for the extraordinary feeling of being able to stop time, to capture fleeting beauty, to record their own lives and to cure broken hearts. "Take a camera," one magazine advised its women readers, "and you will get so everlastingly bothered that other troubles will fade away."

Getting evidence of a fowl deed

It was not only the photographers who got bothered. One of them confessed that in his quest for lively pictures, he had deliberately startled a vegetable peddler's horse. It took a purchase of 80 cents to assuage the wronged merchant. "Expensive? Yes, but another picture having action in it." Another man wrote that his neighbor's chickens had been raiding his garden. "I couldn't make my neighbor believe that his fowls would so disgrace their bringing up," he added, until one morning his camera caught "an old rooster and three or four of his best girls at work on my early peas." He took the pictures to court and won $10, plus costs. But if they were at times dead practical, the new photographers also bubbled over with enthusiasm.

The rage for snapshots was intense beyond any ordinary infatuation with new technology. It reflected not just litigious and artistic impulses, but also an element of the voyeuristic (as in an early *Los Angeles Times* account of a photographic expedition into a Chinatown opium den) and a muted hint of the erotic. A typical cartoon of the day showed a small army of

Inventor George Eastman was caught in the act by fellow photographer while on business trip to Europe.

photo fiends at the beach, recording the attributes of a modest young woman in a knee-length bathing dress (opposite). But the snapshot also seems to have touched some deeper strain in the human soul by allowing anyone to capture his own or another person's image as it actually was, not as an artist represented it.

"BEWARE THE KODAK," the *Hartford Courant* editorialized in 1888. "The Kodak has added a new terror to the picnic"—the terror, that is, of being immortalized at some foolish moment in a snapshot that might be passed around among one's acquaintances. "And the young fellow who wishes to spoon with his best girl while sailing down the river must keep himself constantly sheltered by his umbrella." The writer clearly had tongue in cheek. It was equally clear, however, that the beginning of the snapshot era was a turning point in both the history of photography and the way people viewed their world.

Some of the earliest pictures taken by those photographers are in an exhibit that opens June 24 at the George Eastman House in Rochester and runs through October. The show is called "The Snapshot at 100: A Celebration of the First Century of the Kodak Camera," and among other subjects it looks at the snapshot in family albums and at war.

The idea of the snapshot actually dates back several decades before George Eastman sold his first camera. The word originally was a British hunting term for a shot hastily snapped off. Photographers began to borrow it as early as the late 1850s in discussing what they

termed "instantaneous" pictures, that is, pictures exposed for just a fraction of a second. Where most photography then required the subject to sit with head in a brace and eyes bugged out for some 20 or 30 seconds, the snapshot held out the tantalizing prospect of spontaneity and of stopping motion in midair.

Eastman was a 23-year-old bookkeeper at the Rochester Savings Bank, hardworking and ambitious, when he took up photography in 1877. He quickly learned that his new avocation required him to be dauntless, foraging for pictures under the burden of "a camera about the size of a soap box, a tripod . . . big enough to support a bungalow, a big plate-holder, a dark-tent, a nitrate bath, and a container for water." For every photograph, Eastman found, he had to coat a glass plate with chemical solutions and then expose and develop it while it was still wet.

He became a student of photographic chemistry. When he came across a formula in a British journal for a gelatin emulsion that could be used when dry, he began improving the recipe, often working all night in his mother's kitchen. He also developed a machine to coat the emulsion onto glass plates. Though still a rank outsider with less than two years' experience in the photographic world and no formal education past the age of 13, he had the gumption to take his design to England, then the center of the photographic industry. He got a patent and licensed the machine to the established manufacturers. The royalties helped him get started as a producer of dry plates in this country.

The dry plate began to demystify photography, taking it one step away from the "secrets of the dark chamber." Because the dry plate worked at faster shutter speeds, it also led in the early 1880s to the first snapshot cameras. Introduced by a variety of manufacturers, these were typically satchel-like boxes containing a half-dozen plates. They became known as "detective cameras" because they allowed the photographer to make pictures without the sort of telltale apparatus that, to Eastman, suggested a patent medicine show. Photography began to grow and as early as 1885 a newspaper in Rochester was suggesting that the detective camera was going to "work a revolution in manners."

Eastman himself had similar ambitions. He seemed, even then, to know how far photography could go and

Richard Conniff says that he was a "photo fiend" at college, but since then he has focused on writing. He is the author of Irish Walls, *published in 1986.*

In pre-snapshot days, equipment was bulky. A Crimean War photographer hauled cameras, plates in a van.

Turn-of-century reenactment shows early photography studio complete with brace to steady subject's head.

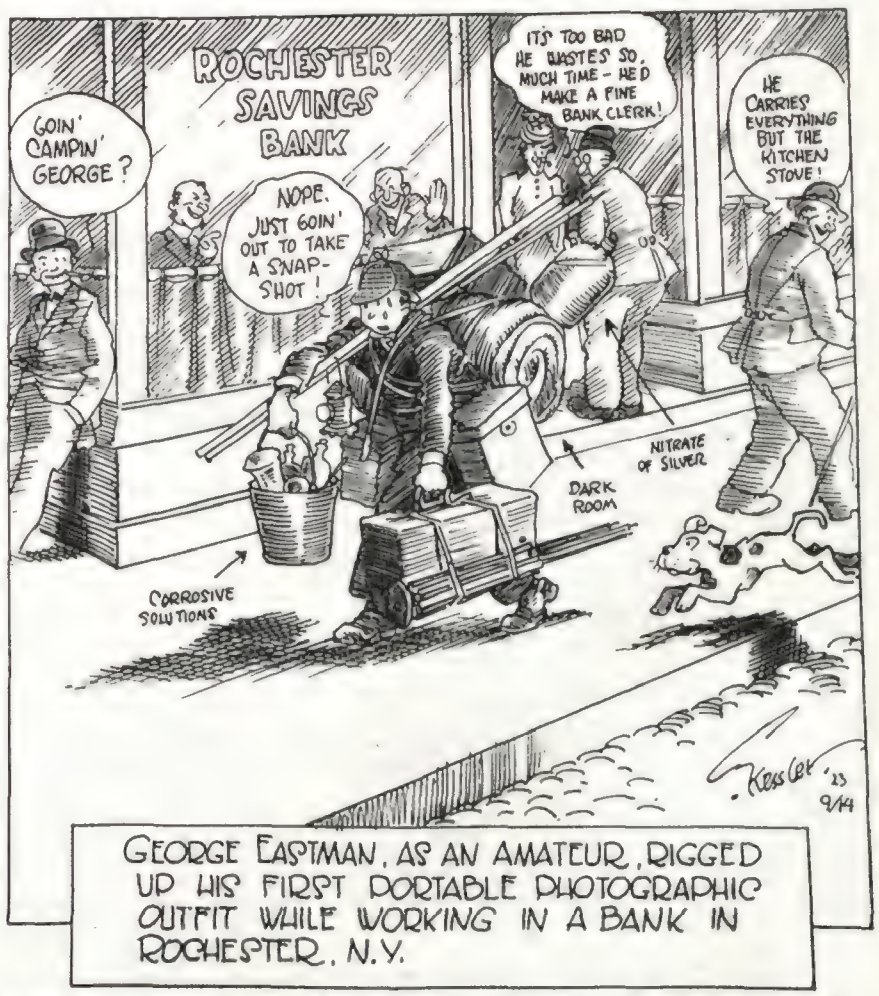
what it would take to get it there. The dry plate wasn't enough. He set out with an associate to develop a substitute and in the mid-1880s he introduced a product called "American film." Sold in roll form, it consisted of a paper backing that was stripped away in the darkroom from an emulsion-coated layer that bore the image. Eastman also began selling a roll holder for winding the film past the lens; it was designed as an add-on for existing cameras. "The whole machine weighs two and three-quarter pounds," Eastman told a reporter as he held up the roll holder loaded with 50-exposure film. "A corresponding amount of glass plates and holders would weigh 50 pounds."

Many professional photographers found the new film hard to develop. Eastman responded to that impasse with an improbable stroke of genius: if his film was too complicated for professionals, he would take it to the "general public and create a new class of patrons." And he would do so with a camera that was smaller and simpler than any detective camera to date.

In 1887, he began developing the "little roll holder breast camera" that was to become the first Kodak. It would require no fooling around with glass plates, shutter speeds or aperture, no tripod (it weighed less than two pounds fully loaded) and no focusing; it would not even have a viewfinder. The photographer would simply wind a key to advance the film, pull a string to set the shutter, point it in the right direction, then press the button. Eastman's failure with a previous model taught him to design the new camera for ease (and therefore economy) in manufacturing, too. Thus the original Kodak produced a circular image because a rectangular image would have required a more elaborate and expensive lens. The earlier difficulties with stripping film suggested the brilliant idea that the company itself would do the developing.

Nobody knows where Eastman got the confidence and determination with which he executed his daring plan for the Kodak. His father had run a successful business college but died when the boy was just 7. Eastman himself attributed his levelheadedness to his mother, who lived with him until her death. (On a trans-Atlantic trip when he was in his mid-30s, he wrote that he kept her picture on his stateroom wall.) He seems to have been driven partly by a fear of poverty, and by the memory of his mother taking in boarders to support her young family. But his success was hardly the stuff of penny-novel heroes. He was too sensible, too businesslike for that. George Eastman was a genius, but more the visionary organizer than the woolly, romantic inventor.

Eastman intended his new camera "to change the


ROCHESTER SAVINGS BANK
GOIN' CAMPIN' GEORGE?
NOPE. JUST GOIN' OUT TO TAKE A SNAP-SHOT!
ITS TOO BAD HE WASTES SO MUCH TIME - HE'D MAKE A FINE BANK CLERK!
HE CARRIES EVERYTHING BUT THE KITCHEN STOVE!
NITRATE OF SILVER
DARK ROOM
CORROSIVE SOLUTIONS
GEORGE EASTMAN, AS AN AMATEUR, RIGGED UP HIS FIRST PORTABLE PHOTOGRAPHIC OUTFIT WHILE WORKING IN A BANK IN ROCHESTER, N.Y.

A cartoonist poked fun at Eastman going on a picture safari in days before he perfected a simpler camera.

Early camera ad featured the slogan that became a national cliché: "You press the button, we do the rest."

very name of photography," and said as much to Frank Brownell, a close collaborator. He plucked the name he intended to substitute, Kodak, almost out of the air. He was partial to the letter *K* because his mother's maiden name was Kilbourn. Otherwise, he later said, the word was "as meaningless as a child's first 'goo.' "

Eastman began selling the Kodak in June 1888. In July, a photographers' convention in Minneapolis named it the invention of the year. By the following summer, a letter to the editor of a photographic journal was already complaining about those "horrid parts of speech 'to kodak,' 'kodaked,' 'kodaker.' " Eastman's famous eight-word slogan also promptly entered the popular culture. The phrase originated, he said, from samples of possible advertising copy that had been submitted to him. What all of them said, in 500 words or more, was "that the button should be pressed, and that we would do the balance of the work. I finally cut out everything else." In towns with blue laws and prohibition, "Kodak" became a coy euphemism for alcohol, as Thomas Edison discovered on a Sunday visit to a hotel in Pennsylvania. When he ordered a drink, he was told he could have a Kodak instead. "What's a Kodak?" he asked, and the clerk replied, "You just go up to your room and press the button. We do the rest." Both the name and the camera were to become so wildly successful that the company later had to spend heavily to prevent its trademark from slipping away into the common language.

Cameras containing used rolls were sent to plant where prints were made by exposing negatives to sunlight.

Robert E. Peary was soon carrying a Kodak into the Arctic, and an adventurous bicyclist was pedaling his Kodak around the world. Real estate agents sent snapshots to prospective buyers. A Chicago doctor's wife photographed "tumors, cancers and other cheerful things of like character." Western Union posted a man with a Kodak outside a meeting of workers, as a New York paper reported under the headline: "Got The Kodak. Brotherhood Telegraphers Secretly Photographed." In Ireland, nationalists "kodaked" the police who spied on their rallies. In Spain, a traveler found that rural folk mistook his camera for a newfangled gun and ran away. Everybody everywhere "kodaked" their babies.

About the only group that did not immediately embrace the new camera were the professional photogra-

TO A RADAR GUN THEY LOOK EXACTLY ALIKE.

Forget the fact that the car on the left is a legendary performance car. And that the one on the right is a wagon.

A radar gun doesn't notice minor details like that. It focuses on only one thing: speed.

And from that point of view, the Porsche 944 and the Volvo 740 Turbo Wagon look remarkably similar.

In fact, in repeated quarter-mile tests, they came up with virtually identical numbers—both in elapsed time and miles-per-hour. In 0-60 tests, the Volvo wagon actually came out ahead of the Porsche.* Which is no small feat for *any* car, much less a wagon.

It's no wonder *Road & Track* magazine called the 740 Turbo Wagon the closest thing to a five-door sports car.

Which all goes to prove that the Volvo 740 Turbo Wagon is something very rare indeed:

A wagon that's actually worth owning for what it packs up front.

VOLVO
A car you can believe in.

*BASED ON INDEPENDENT ACCELERATION TESTS. © 1988 VOLVO NORTH AMERICA CORPORATION

Grand Canal in Venice was photographed by a tourist using early camera that produced a circular image.

Informality of 1890 snapshot contrasted sharply with the stiff professional poses typical of that period.

phers, who worried that the sudden competition from amateurs would cut into their trade. Those who considered themselves "votaries of the art" were also troubled that photography was being mechanized and made trivial. But Eastman was happy to sell to serious photographers, too. In 1889, he introduced the world's first commercial celluloid roll film aimed at least partly at photographers who actually wanted to "do the rest" themselves. The primitive ancestor of the modern film cartridge soon followed; by enabling the photographer to load and unload the camera himself in subdued daylight, this latest wrinkle began to correct the one serious flaw in the "we do the rest" system. Shipping the camera back and forth could consume as much as a month. Photofinishing depended on good weather in Rochester, where prints were made by laying negatives directly onto photographic paper and exposing them under a skylight (p. 110). Shipping just the exposed film gradually became more popular because it eliminated the painful separation of photographer and camera.

The rapid proliferation of photographers after 1888 amazed and at times horrified almost everyone—and everything. Horses and chickens weren't the only animals caught up in the excitement. When 68 photographers descended on Cloverdale, California, to record the corona during a solar eclipse, "a monkey drawing lottery tickets in the midst of a crowd of rustic gamblers . . . rushed up a . . . lamp-post to escape from a danger it could not understand," according to a photographic journal. In London, Gilbert and Sullivan equipped the chorus girls in their new opera *Utopia* with 50 Kodaks pointed at the audience, and one newspaper speculated about the effect this might have on a balding philanderer in the front row. Would he rush from the theater trembling at the idea of being photographed with the "other" woman? Would he placate his outraged spouse with a new sealskin coat? Would too much of this sort of thing lead to the extermination of Arctic seals?

Photographing couples on park benches

Newspapers of the day were full of loving couples caught off guard. "Hang it," says an amorous young man in one cartoon as he's drawing his girl off into a corner, "I'm sure I heard one of those confounded Kodaks!" She replies that her brothers all have them. A New York businessman reported with grim satisfaction on a blackmailer recently convicted for photographing some couples kissing on park benches. The businessman had just returned from a three-week tour of the Berkshires by carriage, "a rather difficult vehicle for the ladies to climb down from without more or less exposing their ankles" for the benefit of "this brother-

Romance, sharing, devotion, memories, love.

A diamond is forever.

De Beers

hood of Peeping Toms." At an English university, law students debated the liability of a fictitious Mr. Kodak, whose snapshot of a dalliance led to a divorce.

The camera ran up against unstated notions of decency and often rolled right over them. It was one thing, for instance, to gawk at some accident, possibly under the pretext of commiserating with the victim; it was quite another to make a snapshot of the carnage. "Is there a physician here?" a train conductor asks, in an 1894 cartoon. "Man in the next car's got a fit." A "photo fiend" jumps up and exclaims, "By Jove! Where's my Kodak?"

The snapshot institutionalized the natural (but hitherto largely disguised) impulse to rubberneck. People were fascinated by snapshots of train wrecks with the wheels still spinning and the smoke blowing. Eyewitness accounts might vary on key details, but the snapshot was a vivid artifact of the actual event. Back in 1885, Eastman had made the remarkable prediction that the camera would be "as necessary to the newspaper correspondent as the pen." In the 1890s, newspapers began to see the wisdom in this. It is a 20th-century idea that the image of an event can be more important than the event itself, but it started here.

Some people found it unsettling not just that their picture could be "taken" at any time, but that it could be *used*. One writer spoke indignantly of the danger of "being made ridiculous for the benefit of posterity." Authorities in this country and Germany argued that the individual should have a copyright on his own face, and in New York legislation was introduced to spare reputable people from "being portrayed in newspapers and other publications in embarrassing and uncomplimentary attitudes, or side by side with the debased, the criminal and the degenerate."

At first, snapshot photography was a toy mainly for the middle and upper classes. Eastman's original $25 asking price for a camera represented a month's wages or more for the average laborer. But he was aiming at the mass market all along, and in 1895 he introduced his $5 Pocket Camera. He had invested heavily in technological innovation, hiring the best brains he could find. He was too pragmatic for corporate chauvinism and when somebody else had a better idea, he either bought the idea or hired the person who thought it up. Thus most of the improvements that

The message was obvious in poignant 1918 ad that showed an Army officer studying a picture from home.

Young Jacques Henri Lartigue used hand-held camera to record the action in the 1905 Circuit d'Auvergne.

went into the Pocket Camera originated elsewhere.

One of the most important competitors was the Blair Camera Company, which lopped one-third off the length of the typical box camera by the simple trick of turning Eastman's roll holder around. Instead of having the film and the take-up spool in back, behind the focal plane, the Blair Kamaret put them up front on either side of the lens. Blair's Samuel N. Turner also produced an alternative to the Kodak daylight-loading film that is still used in larger cameras today. He taped the film inside a strip of black paper, which served simultaneously as a leader for attaching the film to the supply spool, as a lightproof wrapping and as a film counter. The paper was numbered on the back, and Turner's Bull's-Eye Camera featured a little red window so that you could easily see how many exposures you had left.

Eastman rose to the challenge with a clone of the Bull's-Eye, which he cannily named the Bullet. He and his competitors were by then engaged in a sharp round of patent-infringement suits and subsequent royalty arrangements. Eastman's vision included broad control of patents as the route to what he called his company's "manifest destiny." After his own lawyers told him he was on shaky ground when it came to the Bullet, he bought out Turner (who by then had left Blair to form his own company) for the lump sum of $40,000. The Kodak Pocket Camera, a 3-by-4-inch box incorporating many of Turner's inventions, went on sale almost immediately. Demand was such that Eastman had to boost production from 100 to 500 cameras a day. He shipped them to dealers in six-packs, and in 1896 he sold his one hundred thousandth camera.

The Pocket Camera coincided with the height of the rage for bicycles, another new toy of the day, and the marriage of the two produced the short-lived phenomenon of the photocyclist. Indeed, Eastman conceived of his lightweight roll holder at least partly with the cyclist in mind, and he later advertised that "a bicycle outfit is as incomplete without a Pocket Kodak as it would be without a pump."

But it was the Brownie, not the Pocket Camera, that secured permanent, popular status for snapshot photography. The Brownie fulfilled Eastman's ambition to make picture taking simple and cheap enough for any boy or girl. Introduced in 1900, it wasn't the first

In a cunning appeal to children, a youngster showed off Brownie and football. Brownies came out in 1900.

Beribboned "model" strikes a dreamy pose (left) while photographer peers into the viewfinder. A collage of antique cameras, manuals, pictures (opposite) evokes an earlier era when both photography and life were less complicated, but not necessarily less satisfying.

$1 camera, but it was the first to take presentable pictures. It skimped where it didn't count, substituting strawboard for wood in the housing, and leatherette for leather outside. The name came from elfin figures called "Brownies" in a series of popular children's books created by the illustrator Palmer Cox. Eastman arranged for these figures to appear in his advertising (and for Kodak-equipped Brownies to appear in Cox's subsequent work). "Take a Brownie home for Christmas," said the ads. Children whose parents didn't come through often bought their own.

Not only were 750,000 of the original Brownies sold, but the Brownie also became one of the first cameras for many great photographers of the new century, among them Henri Cartier-Bresson, Jacques Henri Lartigue and Ansel Adams. Instead of "dulling the senses," as early critics had predicted, the snapshot camera was awakening them. Indeed, those 12 dramatic years since the introduction of the first Kodak had produced not just the important technologies for future photography, but also a crucial change in thinking as well. Alfred Stieglitz, then a young photographer and a leading advocate of modern art in New York, had joined in the early sniffing and snorting against the hand-held camera. But by 1897 he was urging it on his colleagues and also using it himself to capture life at the "moment when everything is in balance."

Painters were also using the hand-held camera, not just to make studies but in much more subtle ways. Painting, and for that matter, photography, too, had previously concentrated on "what was known to be important," in the words of John Szarkowski, director of the photography department at the Museum of Modern Art. But the ubiquitous snapshot recorded anything and everything—shop windows, family pets, unimportant people. And once those kinds of subjects were immortalized in a picture, says Szarkowski, "trivial things took on importance."

The snapshot influenced the technique as well as the subject matter of serious art. Edgar Degas was an enthusiastic photographer, and cultural historian John Kouwenhoven notes the "snapshot" composition of many of the scenes he painted. The development of modern art from Courbet to Picasso paralleled the development of photography, which Kouwenhoven attributes in part to the "delightful significance" revealed by snapshots in everyday objects. A fondness for what historian Frederick Lewis Allen would later call "tremendous trifles" showed up in writing, too. In 1895, Kodak ads featured a testimonial from Rudyard Kipling. A few years later, the novelist Emile Zola declared: "In my opinion, you cannot say you have thoroughly seen anything until you have got a photograph of it." What George Eastman had created was not merely a camera, or a company, but the beginnings of a snapshot world.

The book of the
BROWNIES

Caprice.
No luxury car is so big for so little.

Caprice offers six adults a choice of luxury from the least expensive

Caprice at $12,030* to the total luxury of the Caprice Classic Brougham LS you see here at $15,091.*

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THE *Heartbeat* OF AMERICA

TODAY'S CHEVROLET

By Israel Shenker

Playing with blocks can be a fine art at this theme park

Legoland stands as the monument to a tiny brick that for 39 years has spurred the imaginations of youngsters—and their parents

Park's custom-built version of Mount Rushmore towers 50 feet over the Wild West town, Legoredo.

The basic building block of the Universe may be not the atom, but a fundamental article called the Lego brick. A tiny, studded block of plastic, with cavities to grip the studs of another block, Lego has wrought myriad things bright and beautiful, great and small. Two eight-studded bricks of the same color can be joined 24 ways, and six bricks 102,981,500 ways. In this expanding universe—with specialty components such as gears, wheels, hinges, windows, arms and legs—can be found a sizable chunk of nature and artifacts: people, houses, machinery, vehicles, trees and flowers, animals—a colorful microcosm.

With Lego, creation is child's play. Marketed as a toy for the past 39 years—in the United States for 27—Lego has come into the hands of an estimated 200 million to 300 million children and is sold in 125 countries. In Western Europe, seven or eight out of every ten households with small children have Lego. For Sweden, the figure is 87 percent; Denmark is a close second at 84 percent.

The Danish town of Billund (pop. 4,531) is the place that launched the thousand ships, plus robots and space stations in heaven; and on Earth, trains and traffic and urban sprawl. Here, gleaming modern factories send Lego forth for the delectation of the world's young, to say nothing of their parents. It is also the site of Legoland Park, a rural theme park that is Denmark's biggest tourist attraction other than Copenhagen.

Acrylonitrile butadiene styrene granules dyed to Lego's secret specifications pour into Billund from factories in Holland and Germany for trial by heat (437 degrees F) and pressure (24 to 150 tons). This process converts the granules into a paste that is injected into molds to produce seamless units. Many of these units are further decorated and assembled by great robotic machines into tiny components: acceptable Lego figures drop to the left, outcasts to the right. There are more than 1,200 different pieces, each of which can be made in any of 12 colors, though the

The creation of artist Bjorn Richter, it required a total of 1.5 million Lego bricks, 40,000 Duplo bricks.

main ones are white, yellow, red, blue and black.

Random samples are meticulously tested for size, sharp points or edges, damage when dropped or compressed, torsion, flammability, toxicity, colorfastness (except for electrical units, Lego components can be washed in water heated to 105 degrees F) and "clutch power"—a phrase the company uses to describe resistance to separation. Optimal clutch power comes after eight to ten couplings. Pneumatic-powered steel jaws mimic children's choppers, treating Lego components to the ultimate indignity: trial by biting.

A development group dreams up new components in a workshop barred to those without security clearance. Not long ago, Lego added a tiny skier to the line and—with art imitating life—the little ones kept coming off the slopes with fractured arms or legs. One unhappy customer, a Copenhagen architect, returned his mortally afflicted specimen in a tiny coffin. Compas-

Photographs by Marvin E. Newman

Taking a play break in well-stocked bin, it's heaven on Earth for a young German visitor to Legoland.

Lego's president, Kjeld Kirk, is founder's grandson; as a child, he used to test prospective Lego toys.

Revolving Legotop dominates Miniland landscape, which brings together colorful sights of the world.

sionate Lego quality-control technicians eventually diagnosed the ailment.

The company used to make its molds in Denmark but now takes advantage of precision toolmaking elsewhere—one Lego toolshop is in West Germany and, to encourage intracompany competition, two are in Switzerland where former watchmakers work to a tolerance of five one-thousandths of a millimeter, less than the thickness of a human hair. It takes several hundred hours' work to make a mold, each of which can squeeze out millions of pieces. Molding machines work nonstop, with three shifts of attendants. Fearing unscrupulous competition, the company inters worn-out molds in the concrete used for its new buildings.

One of Lego's proudest constructions is a facsimile of the Mount Rushmore Memorial (heads of Washington, Jefferson, Lincoln and Teddy Roosevelt) made of 1.5

Port of Copenhagen (at center) took two years to build; at lower right are airport, Columbia space shuttle.

Fishing village named Reine, located on a Norwegian island, is copied at Miniland down to the last flag.

million Lego bricks. This masterpiece of the brick-player's art towers above Legoland Park, Denmark's Lilliputian wonder—25 acres, 32 million bricks and 15 million visitors (17 percent of them adults unaccompanied by children) since it opened in 1968. Legoland has the Columbia space shuttle at the launchpad; the port of Copenhagen (3 million bricks, 2 years' labor by 8 model makers); the Danish royal family's Amalienborg Palace (only Legoland, the Queen and government buildings may fly the royal flag); the canals of Amsterdam; Abu Simbel; the Parthenon; the Statue of Liberty (7.5 feet tall and 1.4 million bricks); Big Chief Sitting Bull (1.2 million) and a buffalo hunt (2.5 million).

Israel Shenker, who is a frequent contributor to these pages, has written in recent issues on the Marks & Spencer stores and painter J.M.W. Turner.

Most exhibits are on the scale of 1:20. Adults and children loom over the buildings, giants stalking the terrain landscaped with artificial hills, dwarf trees and miniature shrubs. Just inside the entrance is Denmark's own Hans Christian Andersen, the celebrated master of fairy tales, transformed into gray, life-size Lego. In play centers are vast "sandbox" troves of Lego pieces for visitors to build with. Daily prizes reward the best constructions, using no more than 25 elements, in three age categories.

Legoland also boasts some non-Lego creations. In addition to a museum with 1,200 toys, it has Titania's Palace, an 18-room dollhouse that is one of the wonders of the century. English painter Sir Nevile Wilkinson and his staff took 15 years to build the palace for Sir Nevile's daughter, who wanted a house for the fairy queen and her family to live in. Inaugurated by Britain's Queen Mary in 1922, it cost Legoland £135,000 in 1978 at Christie's, the London auction house.

Legoland leaped at the chance to salvage at auction more small-scale trophies, these from the 1,300-ton *Louisiana*, a German ship that foundered in a storm off the Danish coast on its maiden voyage to New York in 1868. Divers brought up crates of German dolls—heads, bodies, arms and legs intended for assembly in America. Legoland belatedly discovered it already had better specimens in its collection of 450 dolls and dollhouses dating from 1580 to 1925.

Entirely 20th century is the driving school where children from 8 to 14 can earn a Legoland driver's license in 20 minutes by steering electric cars, speeding at 5 miles per hour through a complex traffic circuit rife with traffic signs and danger signals. Each car bears

In this Legoland storage room, the U.S. Capitol, Don Quixote and friends await their place in the sun.

At driving school, where a lesson lasts 20 minutes, flag of each child's home country adorns dashboard.

a number and a flag indicating the nationality of the driver, and instructors offer advice, even the occasional reprimand, in the driver's language.

For more sedate children the park offers a merry-Lego-round and—for all ages—daredevil whirling rides. For the analytical-minded, there are working models of canal locks and railroad trains, windmills and drawbridges, as well as copies of towns old and new. From the church in scaled-down Ribe—one of the oldest towns in Denmark—come the tones of organ music. Model makers seek original architectural plans for each building. After a model of Denmark's Holmen Naval Base was installed, the original architect asked for pictures: because of military security, he'd had problems photographing the real buildings he had designed.

For those who want a change from piecework, Legoland offers Legoredo, a Western town with saloon, jail and Legoldmine, where visitors can pan for "gold." Palle Thogersen, who is now 66, has been "sheriff" for 15 years, and annually appoints 30,000 honorary deputies. At least once a day he emerges from his office, fires a pistol—with blanks—into the air and goes through the motions of arresting some unsuspecting youngster on a trumped-up charge—anything from stealing cattle to breaking up the saloon to drinking in the streets.

When Legoland closes each year on the third Sunday in September (it opens May 1), conservation work begins. Water is drained from canals and ports; the space shuttle and windmills are tethered in place to prevent damage from winter winds; Chief Sitting Bull's feather goes into storage. The Hotel Vis-à-Vis, whose playful designation stems from its position across from Legoland, connected by an overpass, sees its clientele change from tourists to businesspeople.

Ready for a new crop of designs

The park now gets ready to receive the new figures prepared by Lego's designers and model builders. Each construction is assembled, then taken apart and reassembled—this time the pieces are not only clutched together but also glued. The large worktables are surmounted by transparent containers that resemble medical drips and feed glue down to the model builder's brush. Currently in storage are Philadelphia's Independence Hall, a Moorish palace, a Spanish bullring, Santa Claus, Pinocchio and the U.S. Capitol—28 feet wide, 10 feet high and weighing 1,300 pounds (above).

Professionals in Billund have their hands full keeping up with amateur enthusiasts. A 15-year-old Danish boy made a Lego robot that not only walks, turns, carries things and eats spaghetti, but flashes green eyes after a meal. Thirty architects have created dream villas of Lego. A Swedish pharmaceutical company employed

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Legoland Airport, which handles both domestic and international flights, incorporates the very latest in high-tech aerospace architecture. The kids can duplicate it at home; all they need is 687,860 pieces.

Lego Technic components for titration-analysis equipment. Lego models have been put into wind tunnels to test building design. In Australia, the University of Adelaide used transparent Lego bricks for teaching dental students how to fill cavities. Periodically there are model-building competitions. When the World Contest finals are held this August at Legoland, the competitors will include three American youngsters.

Ole Kirk Christiansen was the father of it all. Born in 1891 in Filskov, a village northwest of Billund, he started earning a living at age 6 tending sheep, whittling while he worked. After learning more-complicated carpentry from an older brother, he bought the Billund Woodworking and Carpenter's Shop in 1916 and built houses, furniture, windows and doors. When the Depression halted construction jobs, Ole Kirk began producing ladders and ironing boards, sometimes first creating scale models to see how they would work. This led him to making wooden toys— cars and trucks, trains and airplanes, and animals—especially a handsome duck on wheels.

But Ole Kirk was a poor salesman who couldn't bring himself to promote his own products. One of his rare customers was the bailiff who received a couple of toys whenever he arrived to collect debts. His nine brothers and sisters came to the rescue by guaranteeing a bank loan, pleading with their improvident sibling "to make something more useful than toys."

Stubbornly, Ole Kirk added building blocks to the line, then milking stools and Christmas tree bases. When yo-yos became popular he turned out thousands; then when the craze evaporated he cut the yo-yos in two and used the halves as truck wheels. In 1934, he offered a bottle of his homemade wine as a prize to anyone who could think up a good trade name, and won it himself with Lego, a contraction of the Danish "*leg godt*" ("play well"). Later he learned that in Latin it meant not only "to read" but "to gather together."

After World War II, as plastic came into wide use, Ole Kirk produced a plastic baby rattle in the shape of a fish. Lego made its first plastic bricks in 1949, though the Danish toy-trade publication warned that "plastics will never take the place of good, solid wooden toys." In 1956 Lego again offended reason by

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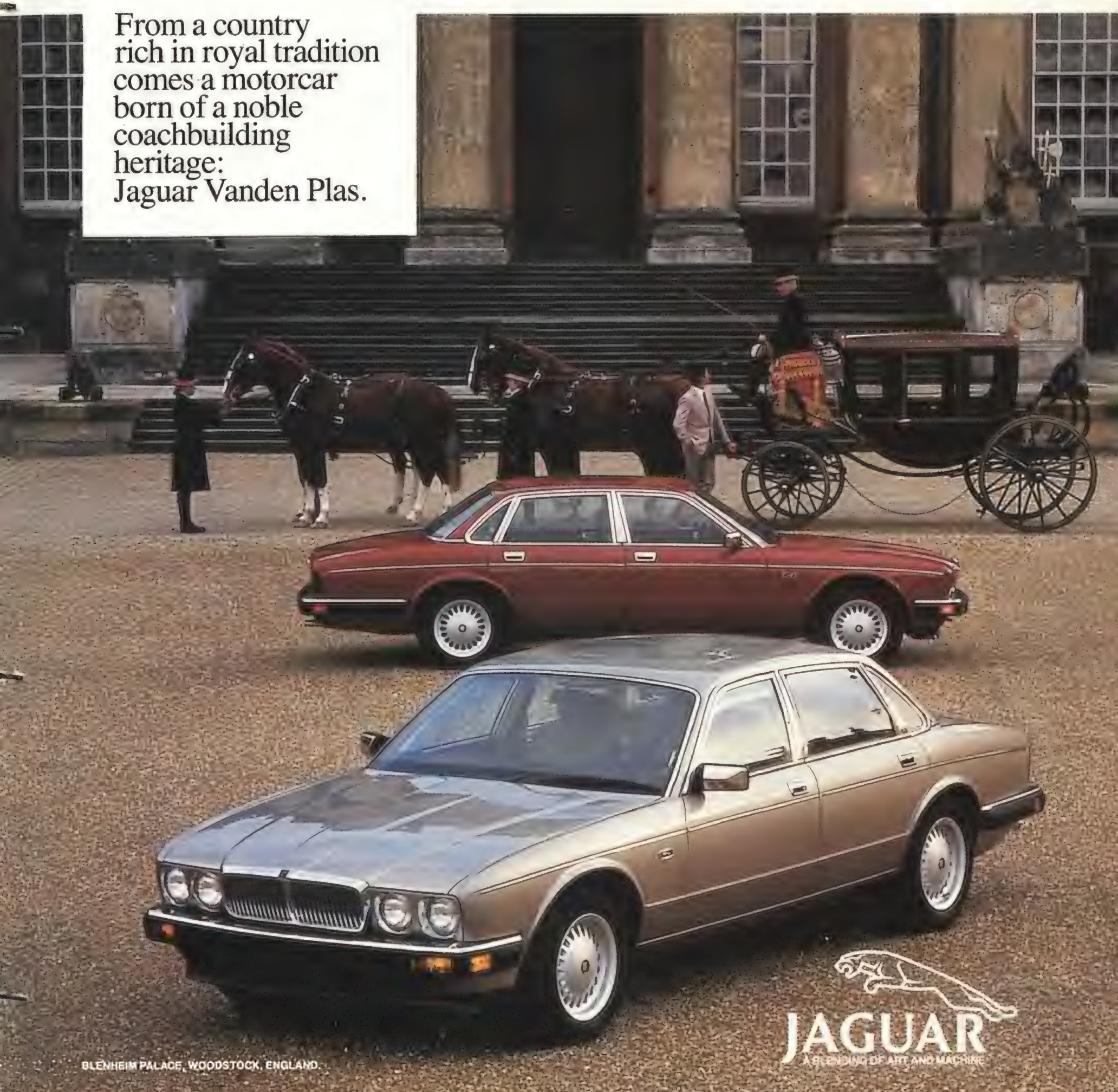

BLENHEIM PALACE, WOODSTOCK, ENGLAND.

JAGUAR

A BLENDING OF ART AND MACHINE

exporting toys to Germany, one of the world's most celebrated toy-making countries.

Two years later came the great breakthrough—the stud-and-tube coupling principle—and soon it was hard to cope with orders. Not long afterward, the expanding enterprise introduced a second line called Duplo. This was Lego writ large for tots, ages 3 months to 5 years, bricks eight times the size of Lego to accommodate tiny, unpracticed fingers and to make swallowing more difficult. But Duplo was compatible with Lego, so that children graduating to Lego (intended for ages 3 to 12) could couple the small pieces with the large. Having begat Duplo, Lego then begat Lego Technic for youngsters 7 and up.

For a time, all four of Ole Kirk's sons worked at Lego. Godtfred Kirk Christiansen, known as GKC, was a late starter who did not take his place on the line until he was 12, attending school every other day. One evening, Godtfred proudly told his father that he had economized by skipping a coat of paint on the toys he had carted to the station. Ole Kirk immediately sent him back to retrieve the substandard shipment and put him to work that night painting for dear life. Not for nothing was father's motto—which today hangs on the factory wall—carved in wood: *Det beste er ikke for godt* (Only the best is good enough).

Having learned many such lessons, GKC took charge on his father's death in 1958. In 1979 his son Kjeld Kirk Kristiansen took command, continuing the struggle for world Legopoly. Today there are factories in Billund (three) and in Switzerland, Brazil, South Korea and the United States (at Enfield, Connecticut), with Lego's own sales companies in 20 countries.

Now 40, Kjeld intends to keep Lego in the family as long as he can. He has three children, all under 10, and he has not outgrown the family's first love. "I don't think you can ever get tired of Lego," he says. Nor does he plan to launch the company into the next yo-yo or Hula-Hoop craze: "Our philosophy is not to go with quick fads."

This poses problems in the United States. "The American market is like a roller coaster," says Vagn Holck Andersen, president of U.S. Lego, "and the American public looks for novelties."

Lego has traditionally avoided a classic theme that many other manufacturers feature. Ole Kirk decreed that Lego was to be a peaceful toy, and the company shuns martial motifs and guns. The idea of producing a castle and knights caused soul-searching; the family finally approved a medieval model as romantic, rather than bellicose. "We have seen beautiful tanks and machine guns made out of Lego," the company's public relations director acknowledges, "but we don't want to inspire children to make them. We claim our space scientists are peaceful people exploring the Universe." (It must be admitted, however, that some of its space kits, with names like Invader and Alienator, look rather aggressive for use on a scientific expedition.)

Today the company is as prosperous as ever. It even has its own fleet of (real) executive aircraft. Lego originally flew its planes from a local meadow and, after modernization and expansion, gave its airport to the surrounding communities. Billund Airport (its terminal was first modeled in Lego bricks), bustling with scheduled international and domestic flights, is now second in Denmark only to Copenhagen's.

The airport flanks Legoland, whose Legotop—a revolving observation tower—affords a bird's-eye view of the Lego airport with its model planes. Just a short distance away, real planes are taking off. For a moment one imagines that these, too, are made of Lego. Legoptical illusions are stock-in-trade at Billund: factory pillars made of Lego, even the map of Denmark with telltale right-angled coasts. The visitor turns wary, wondering if the herring at lunch will prove to be tooth-defying Lego.

Some flights of fancy are definitely unpalatable, and though Lego itself was originally based on a British prototype, the company vigorously takes to the courts to pursue imitators. A South Korean counterfeiter has come out with Coko and Cokoland, a copy of the Lego castle set; India produces Leggo; and Billund bristles at a "*Sovjetisk plagiat af Lego elementer*" ("Soviet imitation of Lego components"). Grudging admiration, however, goes to the Chinese rip-off artist whose packaged clone features not a name but a number: 0937. Stood on its head, it's the winning combination.

Life-size zebra in Legoland safari moves in to sniff the camera (after a while, the animals start to look real).

What we know about computers we've learned on the phone.

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The First Electrical Digital Computer

Working for AT&T Bell Laboratories, a mathematician and an engineer used two numbers to change forever the way we compute all the rest. They applied a binary code to a calculating machine for the first time and invented the electrical digital computer.

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Funny, how the future seems to repeat itself.

1947
The Transistor

The modern era of computer science and technology began when three Bell Labs scientists invented the transistor. Their work launched the worldwide semi-conductor industry. Made possible the micro-electronic devices that give modern computers such versatility and power. And, later, won for them the Nobel Prize in Physics.

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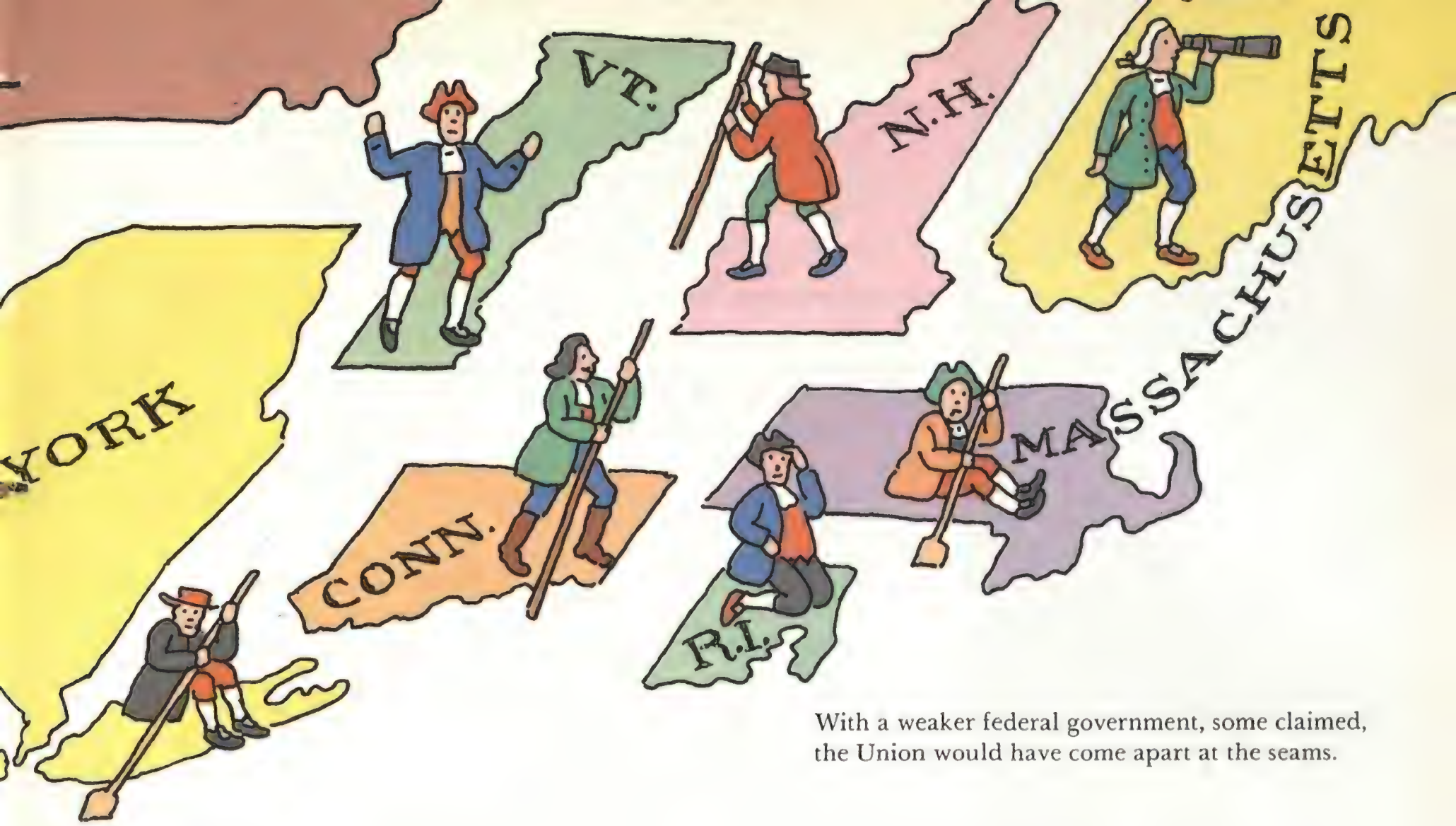

With a weaker federal government, some claimed, the Union would have come apart at the seams.

By Timothy Foote

What if, back in 1788, we hadn't ratified Mr. Madison's Constitution?

The answer is speculation, though clearly many a great event in America's history would not have happened the way it did

Return with us now to the days when the East was young. From out of the past come the thundering hoots and hollers of a great debate, as the raw, underpopulated, bitterly divided ex-Colonies wrangle over their future. In the troubled spring of 1788 all the uproar is about whether or not the still-sovereign states will ratify the text of the new Constitution coopered up by delegates in Philadelphia the fall before.

The goings-on in Philadelphia were secret. But the document, so cavalierly ascribed to "We the People," is now out in the open, and each side is busy claiming that if it doesn't get its way, wolves will be running in the streets and life as we know it will shortly come to an end.

Federalists, led by James Madison, declare that nothing less than the complete text of the new Constitution will do. There must be no backsliding to even a modified version of the weak-kneed Articles of Confederation. We need a strong government with broad powers to tax, pay debts, regulate trade and defend the country from foreign enemies. Without it, the brave New World experiment in self-government will founder and split into rival economic confederacies,

Illustrations by Seymour Chwast

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and soon be gobbled up by the crowned heads of Europe.

Not so, anti-federalists insist. The new Constitution will destroy the very independence for which we fought the British. The President it establishes will be more powerful than any king. The crushing grip of the Executive and Congress together will intolerably impinge on the liberties of individual states and citizens. Worse, by stirring regional fears of being steamrollered by rich lawyers and stockjobbers in the populous Northeast, the new Constitution will sap the spirit of cooperation that has thus far held the states together.

The Louisiana Purchase goes out of the history books, along with much else . . .

History is written by the winners. For the past century or so, Americans have assumed the federalists were right. The Constitution was ratified, after all, even if with some anti-federalist modifications. As for the American Experiment, it has worked so well that a hardheaded operative like Otto von Bismarck could speak of the special Providence that watches over fools, drunkards and the United States of America.

No matter that we owe our Bill of Rights directly to anti-federalists. Today, despite the octopus reach of our federal bureaucracy, we think of the anti-federalists of 1788, when we think of them at all, as obstructionists who read history wrong—and perhaps as racists too, since states' rights eventually became code words for the defense of slavery.

But what if we hadn't ratified the constitution Madison worked so hard for? Would the disaster that federalists predicted have really occurred?

We have long been led to believe that ratification was inevitable, an indispensable step to the triumphal progress democracy was destined to make. In early 1788, though, nobody was sure the Constitution would be ratified in anything like the form Madison wanted. What kind of constitution the Union would get very much depended on the big ratification debate. Some states ratified quickly, though in Massachusetts the fight was touch-and-go for awhile, and acceptance came only after the federalists had acquiesced on many "recommendations" for changes to the text. But everyone agreed that without ratification by the two most powerful states in the Union, Virginia and New York, where anti-federalism was rife, those endorsements did not really matter. In neither state did the text that Madison had sweated over in Philadelphia look like a sure thing.

The coastal cities favored the Philadelphia text; farmers and frontiersmen didn't. When delegates specially chosen from all over New York turned up in Poughkeepsie on June 17 for the ratification debate, the count stood at 46 delegates against the Constitution, only 19 for. Down in Richmond, Virginia, where a battle royal was already in progress between Madison and fiery anti-federalist Patrick Henry, just over 80 elected delegates were in favor, with almost the same number staunchly against.

Had television and daily polling existed in 1788, Madison would have been badgered by the 18th-century equivalent of Sam Donaldson, asking him to defend his stand against adding a bill of rights to his constitution. But even without such populist distractions, the Virginia debate was fierce. The issue remained in doubt

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Base coat/clear coat painting is a better way to paint cars. Instead of the old single layer of lacquer or enamel color coat, General Motors now uses two layers of paint on most of our models. The base layer contains the pigment or color, and the top layer is a clear coat of acrylic polymer to bring out the brilliance of the color and give a glossy, mirror-like finish.

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Base coat/clear coat finishes require less maintenance, but they, like all paints, are susceptible to abrasives, which will scratch the finish or give it a hazy appearance, reducing both its gloss and imaging (mirror-like) qualities.

Wash any base coat/clear coat finish with gentle, non-abrasive cleaners, rinsing away all loose dirt with plenty of water before sponging on the soapy solution.

Rinse the cloth or sponge or change it frequently to avoid scratching the finish with dirt or grit. If you use a commercial tar or bug remover, read the instructions carefully, then try it out on an inconspicuous area first.

If you use a commercial car wash, look for one that uses a soft scrub system. A few car wash systems employ harsh brushes, which may scratch the clear coat finish.

Base coat/clear coat paint need not be polished as often as a lacquer or enamel to remove the grime and effects of weathering. When you do polish it (once or twice a year), use a mild cleaning wax, not an abrasive. Polish gently, by hand.

Avoid mechanical polishing or sanding of the surface.

Don't use a scrub brush on the paint or on the wheels, if they're aluminum mag wheels with clear coat paint on them.

You can help maintain the finish on your car by parking and driving wisely. Try not to park under trees, where bird droppings or sap, which contain compounds that can injure the finish, may fall onto your car. Try to park upwind from industrial areas. If you get cement dust or fly ash on your car from any fire or smokestack, rinse it off immediately.

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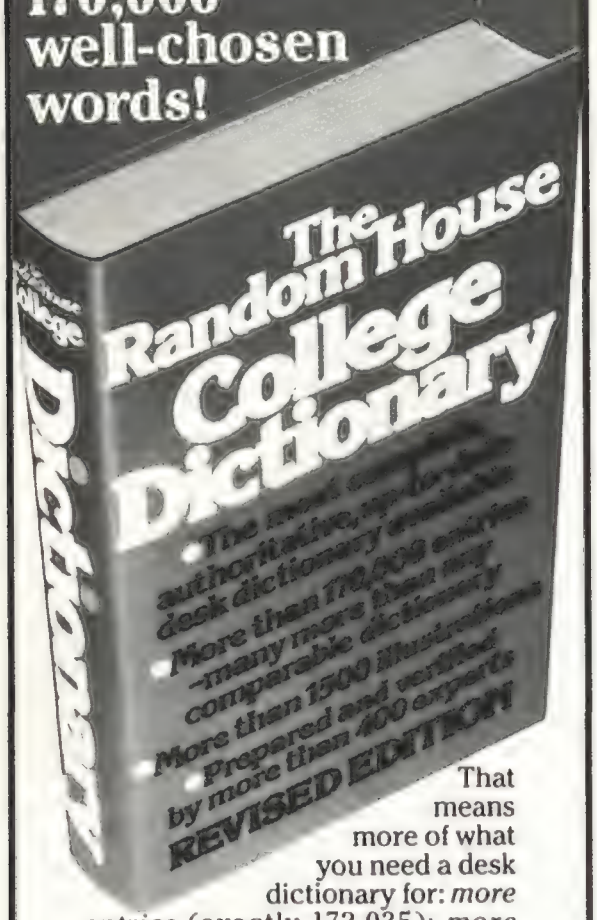

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until Madison finally promised a bill of rights later if only his state would now ratify the text as it was. On June 25, Virginia's exhausted delegates finally approved—by a narrow margin, 89 to 79. Six delegates changing their minds would have defeated Madison and the federalists.

New York's anti-federalists held their 46 to 19 edge well into the convention. But when, at the end of June, a messenger reached Poughkeepsie with the surprising news of Virginia's ratification, some anti-federalist delegates began to drift home: their crops needed tending. New York would approve the Constitution by just three votes, 30 to 27.

Clearly the issue could have gone the other way. If the anti-federalists in New York had voted more quickly. If Madison, who was often sickly, had been laid low by one of his bilious attacks and found himself unable to counterbalance the torrent of anti-federalist arguments flowing from Patrick Henry. A total of eight switched votes in the two states would have produced the second convention that Madison rightly feared, and eventually a much different constitution.

And what would have happened to us then?

Scenario 1 essentially plays out the worst fears (or threats) of the federalists. It should probably start with the grim future they predicted in 1788: the disaster we have long been convinced only their skill helped avert.

The plot runs as follows: after a second convention, the constitution finally agreed upon grants less power to the federal Judiciary. The President is allowed to serve only one term, his powers severely limited, especially with regard to raising troops and making war. The Congress is weaker, too—its ability to tax and spend limited. The sovereign states forming the Union would remain clearly sovereign. And the young United States of America, freighted with the future hope of democracy around the world, is obliged to launch itself into history with one hand tied behind its back.

In Scenario 1, as predicted in Alexander Hamilton's "Federalist Paper 13," the Union soon splits into two confederacies according to economic interests. The business-and-shipping-dominated Northeast turns toward Britain; the agricultural, slave-owning South toward France. The new Northern Confederation includes Massachusetts, New Hampshire, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania and Delaware. The Southern Confederation is composed of Maryland, Virginia, North and South Carolina, and Georgia.

Given a weaker central government, a Scenario 1 map as of, say, 1794 would show the original Thirteen Colonies considerably reduced from the turf—as far west as the Mississippi—acquired under the 1783 peace treaty with Britain. The British, in fact, steadily refused to honor the clauses of the treaty dealing with the Great Lakes and what was called the Northwest Territory, so that by 1794, according to Scenario 1, they would have completed plans for dropping the Canadian border south to Penobscot Bay in the East and acquiring Vermont as a dependent state, a possibility which in fact many Vermonters flirted with. They would also have separated most of the Northwest Territory from the United States as a British-controlled Indian nation. In

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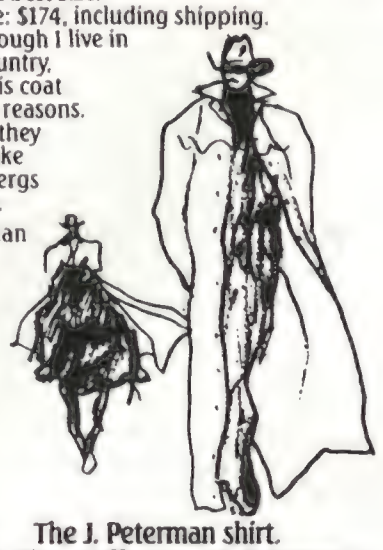

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short, for want of a strong constitution, the weak ex-Colonies have lost control of their claim to all the land west to the Mississippi. Their hope of future expansion toward the Pacific is blocked off, perhaps forever.

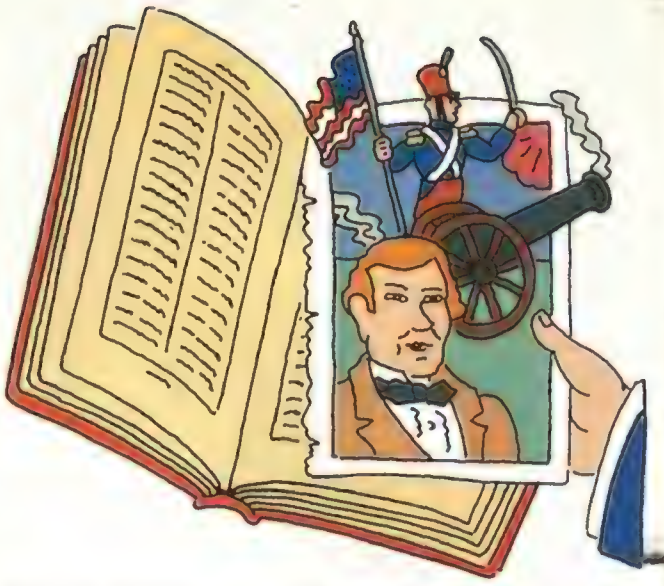
West of the Appalachians the British have it all their own way, continuing with plans to support separatist elements in Kentucky and Tennessee. These frontier folk distrusted Easterners. The new and distant federal government, they correctly felt, had neither the power to protect them from Indian raids nor the will to look out for their right to trade freely down the Mississippi and through Spanish-held New Orleans.

And so it goes, until one can imagine the United States maturing over the decades into a largely coastal nation, surrounded by vast territories linked to the British Empire.

To ask any "What if?" questions of any moment in history is to head down the slippery slope of what many modern historians deplore as "counterfactual speculation." Yet anybody over 40 knows that one way of assessing your life is to look back on roads not taken. And there is something to be said for historian Oscar Handlin's notion that you can't fully understand history, or at least really enjoy it, unless you can see the past as a line made up of millions of points, with every point a turning point that could have gone the other way.

Playing with those turning points, one soon learns the powerful, sly truth embedded in the celebrated story about a question once put by President Nixon to Soviet Premier Brezhnev. "What would have happened if Lee Harvey Oswald had shot Nikita Khrushchev instead of Jack Kennedy?" Nixon is supposed to have asked. And Brezhnev, after a desperate pause, replied, "Well, Mr. President, Aristotle Onassis wouldn't have married Mrs. Khrushchev."

As the Soviet Premier ungallantly perceived, personal character and background circumstances are likely



Not to mention our first overseas campaign, the Mexican War of 1846 . . .

to survive even dramatic, short-term zigzags due to chance, choice or sudden tragedy. And in such terms, the federalists' 1788 scare-the-delegates forecast, though a version of it has been taken as gospel for ages, seems fairly shaky.

Between us and what Jefferson described as the "exterminating havoc of one-quarter of the globe" lay that blessed, great ocean, customarily and correctly credited as a source of our salvation, which until the 1840s often took many weeks to cross. Perhaps it is true, as we still like to think, that America's success may be attributed to some Divine approval of our democratic vision. It was certainly true that beginning only a year after ratification, during the crucial 25-year period of our formative growth under the new Constitution, European threats to the young nation were distracted. Spain was heading into what turned out to be permanent decline. Britain and France, meanwhile, were largely deterred from sustained efforts in the New World by a war that ended only when Napoleon was shipped off to St. Helena in 1815.

By then, French global ambition was temporarily eclipsed. As for the British, who handily burned Washington in 1814 and emerged from the Napoleonic Wars as the most powerful country in the world and our main fear, they had learned the tacti-

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cal limits of trans-Atlantic warfare. During the American Revolution they realized how difficult and costly it could be to try establishing control over unruly Yankees. Their foreign policies and economic strategies were also in the process of change. They would maneuver and poke at us along the frontiers, of course, but essentially aimed to use force and diplomacy to create a worldwide system of commercial advantage, rather than outright colonial control.

As late as 1789 Sir Guy Carleton, Governor General of Canada, did propose creating a British colony called Kentucky, at a time when Kentucky had not yet entered the Union. But he was swiftly rebuked by London. Again, at the armistice negotiations in Ghent during the War of 1812, ambitious Britons expected to snap up territory in the West and North in return for peace, but were not supported by the Foreign Minister, Lord Castlereagh, who instructed them to settle for the status quo antebellum.

The British, the French and the Spanish all had designs upon the infant nation, and no doubt would have been encouraged had the new federal government been less muscular. But whatever constitution was adopted, it was bound to be stronger than the Articles of Confederation, since the country had already agreed that they needed improving. More important, Americans would have remained the people so often proudly described in high school history texts. We were a practical, mostly egalitarian people, possessing a common language, a tradition of British justice, a remarkable political dream of self-government, a seedling sense of continental mission and a deep distaste for being messed with. Despite bitter state rivalries and a patchwork constitution that provided no executive leadership whatsoever, we had broken free of the British Empire. In 1789, no

Timothy Foote, a SMITHSONIAN *Board Editor, most recently wrote about James Madison (September 1987).*

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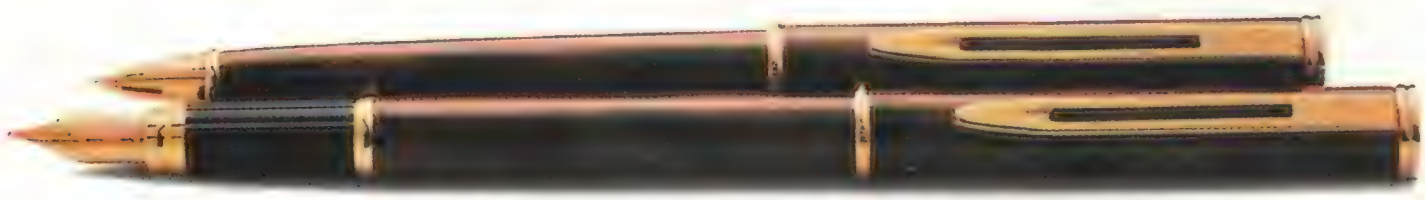

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matter how much a compromised constitution had weakened the new government, the men running it—Washington, Adams, Hamilton, Madison and Jefferson—would have been the same who fought the British and founded the Union in the first place.

Recent scholarship makes clear how much the federalists exaggerated the divisive economic woes of the Union in 1787-88. Their claims were repeated through the years until, as historian Merrill Jensen puts it, "partisan argument became 'history.'" In fact, by 1787 the ex-Colonies were coming out of the postwar depression. Trade was rapidly improving. Contrary to federalist claims, relatively few serious trade barriers existed between the states. Even under the admittedly inadequate Articles of Confederation some of the war debts had been paid. The states were cooperating in the use of the Delaware, the Potomac and Chesapeake Bay. They had even hammered out the Ordinance of 1787, a difficult plan for the Northwest Territory, which included progressive machinery for the region to sort itself out into states and be admitted to the Union. Significantly, that required states like Virginia to cede vast tracts of long-claimed Western lands to the new United States.

Threats and overstatements seem to have been bred into the bone of American politics, and threats of secession were part of the hard political bargaining of the 1780s. But Americans were immensely proud of the Union, and a weaker central government wouldn't have dampened that pride. So federalist claims that without the Philadelphia constitution the seaboard states would quickly divide into two (or three) confederacies don't make much sense. The economy was growing. Though cash poor, the country was clearly land rich with opportunities that would eventually bring immigrants by the millions from all over the world. (The federal government began selling land for a few cents an acre in 1787, and went on selling it, for a total revenue of $44 million by the 1830s.) It seems reasonable that even under a far weaker government, the states would have found a way to go on doing at least the necessary minimum about finance, taxes and internal trade.

Farfetched, too, was the threat of foreign-backed, separatist states actually setting up shop beyond the Appalachians. It is true, of course, that machinations by Spain, France and England, as well as plottings by traitor-adventurers like James Wilkinson and Aaron Burr, make an extraordinary chapter in American history. By the 1790s the depth of Western feeling against the power of the Eastern government was astonishing. Some frontier resentment was inevitable because at first the federal government was bound to be dominated by seaboard states. There is no doubt, however, that the swift rise in central power, and the obvious influence of city financiers and lawyers, helped stir threats of secession. By 1794, Madison himself had already turned against his former federalist friends and was fighting the power of the new government, playing upon frontier resentment until the political air was thick with charges of tyranny.

One federalist argument for strong central government was that it would give the President power to act if trouble started on the frontier. But

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even with a looser federal system, if real foreign threats occurred or local rebellion against the government had broken out, as happened in 1794 when frontiersmen in Pennsylvania rebelled against a new excise tax on whiskey, it is hard to imagine that George Washington would have had trouble raising a sufficient force to put it down.

Time has proved how right the anti-federalists were about an explosive increase in federal power with the consequent proliferation of bureaucracy. So it is tempting, as Scenario 2, to take more seriously than history tends to, the anti-federalist assertion that things would have gone better with a weaker central government operating under a more modest version of the Constitution.

Unlike Scenario 1, Scenario 2, especially in the early decades, cannot be presented as a dramatic map of the states which, in 1794, would have been different from what actually existed then. Scenario 2 suggests that Americans would not have split apart and, with an inevitable press of population from birth and a torrent of immigration, would have eventually annexed any parts of the continent claimed by European powers and wound up, as we have, with most of it. According to Scenario 2, things simply would have proceeded at a different pace and in more peaceable ways. In the early going, especially, it has less to do with turf than with the gradual effect on precedent, policy and evolving national character, of a different philosophy of government—strict constructionism combined with a version of Jefferson's notion: that government is best which governs least.

In keeping with the Brezhnev principle, Scenario 2 offers a list of real and familiar events that *wouldn't* have happened if, back in 1788, those eight delegates had nudged Virginia and New York into rejecting Madison's Constitution.

Among them:

- A capital called Washington, D.C., yes, but not on the Potomac.

In 1790 the new Secretary of the

Treasury, Alexander Hamilton, and the new Secretary of State, his political rival Thomas Jefferson, are supposed to have lunched with Madison to talk over Hamilton's controversial plan for funding the national debt. The Southerners Jefferson and Madison traded their crucial support for it in Congress in return for a deal to place the national capital farther south than seemed likely. Under this scenario, because the funding would have had no chance in Congress, Madison and Jefferson would have had nothing to trade. As a result, the nation's capital, inevitably to be called Washington, winds up on the Susquehanna, not the Potomac.

- No doctrine of "implied powers," broadening down from precedent to President.

In 1790 Hamilton's touchy plan for a National Bank is *not* passed by Congress and then presented to Washington early the next year. Instead, Hamilton consults the President in advance. As he did in actual history, Washington asks Hamilton and Jefferson to advise him about the plan's constitutionality. Hamilton offers his famous, overriding doctrine of implied powers—i.e., that unless something is specifically forbidden by the Constitution, the federal government can do whatever it thinks necessary to carry out its constitutional charge of promoting the general welfare and providing for the common defense. Jefferson, just as he actually did, points out that with such an interpretation the government will soon be able to do pretty much anything it pleases. As we all know, Hamilton won, with lasting effects on expanding federal power. Under Scenario 2, however, Washington, true to the new Constitution's limitations, reluctantly rules for Jefferson instead. The plan is shelved, and the Secretary of the Treasury has to figure out a less controversial and less precedent-setting way of handling the federal cash flow and credit.

- No Louisiana Purchase.

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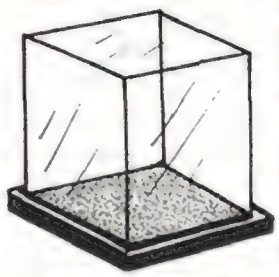

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malaria and the fierce slave rebellion that won Haiti its freedom and destroyed an army of 20,000 Frenchmen sent to put it down, the Emperor Napoleon's hopes for a New World empire, based on the Caribbean and lower Mississippi, have temporarily withered. He is willing to sell Louisiana to the Yankees. But President Jefferson knows his constitutional powers do not permit him to buy it (he worried about this even as matters actually stood in 1803), and by the time he gets the requisite Congressional approval, weeks have passed. Napoleon changes his mind.

- No War of 1812.

Presidents Jefferson and Madison demonstrated that one way to limit the power of federal government and keep down the tax burden is to avoid having anything much in the way of an army or navy. In 1812, we would have been even worse off than we were, especially with regard to the navy. So, despite British confiscation of American cargoes bound for Napoleon's France, and the impressment of American seamen, the American President doesn't lead us into war. He hasn't the means, nor the votes in Congress to declare it, much less pay for it. America, as she did anyway, endures continuing humiliation at the hands of the British, but without a war. Unlike Washington, D.C. in 1814, the nation's new capital in Pennsylvania isn't burned to the ground.

Nothing stays simple. Under Scenario 2 the country grows larger and larger, more and more complex as it was bound to do. And, in keeping with Jefferson's analogy about the need to increase the size of a growing boy's suit, federal powers, even under a modest constitution, expand in order to get things done. Persuasive Presidents stretch what powers they have. At the expense of states and private citizens, Supreme Court Justices like John Marshall try to expand the role of the federal Judiciary. But precedent-producing decisions like Marbury v. Madison and McCulloch v. Maryland (which, respectively, estab-

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By Bob Bergland

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lished the Supreme Court's right to rule on the constitutionality of laws, and expanded the federal government's implied powers) are possible only much later, if at all.

Under Scenario 2, the whole process of extending federal power would have been slowed down. In domestic politics, as things actually happened, it was Andrew Jackson who most explosively and shockingly expanded Presidential power. He fired Cabinet members left and right and made the political spoils system a way of life in Washington. As a popular hero and the head of a party with patronage to give out, he flexed his federal muscles at all times. In his two terms Jackson vetoed more bills (12) than the combined total (10 terms, 11 vetoes) of all six Presidents who preceded him. By the 1840s, the U.S. Presidency was so out of hand that the Swiss, creating a constitution in 1848 and expecting to use ours as a model, used it instead as a caution about runaway Executive power. As a result, their federal Executive is a seven-member rotating council. Under this scenario, what Jackson did to the U.S. Presidency couldn't have been done that early, and perhaps never.

Yet the surging forces that moved America westward, though slowed somewhat, would have been the same: the growing prosperity; the frontier need for tinkering and inventiveness; the all but limitless supply of workable land; and the onward rush of a restless, exploding population constantly reinforced by immigration from crowded, more militarized, less freewheeling countries. Eventually these would simply have displaced whatever foreign forces that might have been capable of standing temporarily in the way.

Many landmark events would have stayed the same, of course. The Monroe Doctrine, for instance, because it began as an essentially protective idea, was in fact first proposed by the British. Indeed, in 1823 President Monroe counted on the British Navy to do

Nobody would have proposed giving us a Statue of Liberty in 1875.

most of the policing work. The massacre at the Alamo in 1836 and the formation of the independent Republic of Texas would have occurred, too, because the lure of new land had drawn 35,000 American settlers there by 1835. Once independent of Mexico, the beleaguered Texans, just as in fact they did, would have appealed in vain for swift admission to the Union and, while waiting, briefly become a British client state.

Under Scenario 2, however, Americans would have gone overboard much more slowly for aggressive, 19th-century nationalism. In the 1840s the political struggle between Whig moderates and expansion-minded nationalists was close. In actuality it was won by the nationalists, the people fired up by the new doctrine of Manifest Destiny (born in 1845 in the mind of a New York newspaperman named John L. O'Sullivan). A portentous, and some would say sinister, turning point in our history was the Mexican War (1846-48), an event that was bitterly resisted by many Whigs. The Mexican War was our first offensive war fought by a serious, trained, volunteer Army led by West Point-trained officers. It was our first war on foreign soil and the first war in which the President gave orders as a confident Commander in Chief.

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then clearly would include California —a chunk of land totaling more than 377 million square acres. Americans have always been land hungry, at least in what we soon came to regard as our own inevitable backyard. And more and more there was also a high-minded, though flagrantly racist, mystique involved, the notion of bringing the benefits of American liberty to "lesser" lands and peoples. "Miserable, inefficient Mexico," Walt Whitman wrote, "what has she to do with the great mission of peopling the New World with a noble race? Be it ours to achieve. . . ."

People today who deplore American militarism, the country's overseas commitments, the influence at home and abroad of what is called the military-industrial complex, may be drawn to Scenario 2, especially those who believe that all wars are bad because they never settle anything. Under Scenario 2, the Mexican War would never have occurred. And neither would that deadliest, most heroic, tragic and shaping conflict in America's history, the War Between the States.

By 1846, President Polk would not have had the political or military means under Scenario 2 to pick an aggressive quarrel with Mexico. As for the Civil War, though the anguished and savage debate over slavery would have evolved to some extent as it did, in the America evolving under Scenario 2, the right of a state to secede voluntarily from the Union would have been clear from the beginning. Nothing like the nullification debates (over whether the states could nullify federal laws they thought unconstitutional) that occurred in 1798, 1828 and 1832 would have been necessary. Nor, despite justified moral and political rage, would the North have developed quite the same holy cult of the Union, bolstered by the new nationalism and Daniel Webster's resounding speeches. Certainly not at anything like the level of passion that actually occurred. Under a looser federal system, the seceding states would have

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been raged at and spiritually spat upon, and no doubt there would have been plenty of divisive violence and bloodshed of the kind that made Kansas the scene of near-guerrilla warfare in 1856. But the states would have had the legal right to go, and the Union would have had no legal right to coerce them.

Even in actual history, the Civil War came very close to not happening when it did, and perhaps not at all. At first, Lincoln made clear that if a way could be found he would preserve the Union at the cost of temporarily extending slavery. Weeks after secession, the actual fighting was triggered by the existence of a federal installation, Fort Sumter, that could not be revictualed, as other federal forts below the Mason-Dixon Line had been, without entering a Southern harbor. Certainly, under Scenario 2, there would have been far fewer such federal military installations. Under Scenario 2 the Southern states might not have felt the need to secede, but had they done so, the North, being essentially what we today call racist, and still partly convinced that property must remain property lest economic chaos ensue, would have expostulated and wrung its hands—and in all likelihood done nothing.

It is nice to speculate that under Scenario 2, common sense, patience and humanity might have accomplished what it took nearly a million American casualties inflicted by other Americans between 1861 and 1865 to do—lift the cross of slavery from Americans, black and white, thus sparing everyone the hatred and agony of Reconstruction as well. There is even a way of construing such an outcome from Scenario 2. It runs as follows:

Americans had officially outlawed the importation of slaves as early as 1808. Great Britain had banished slavery at home and in all her overseas possessions by 1833. From the early 1830s the moral pressure and outrage of abolitionists in America grew steadily stronger and louder. In the South, though their opinions were suppressed, thousands of people hated slavery and wanted to end it, their convictions profoundly touched by books like *Uncle Tom's Cabin* (which Harriet Beecher Stowe directed straight at the nation's conscience) and by the Protestant evangelical movement generally. In a South less emotional, less fearful of military intervention, there would have been less embattled solidarity. It is possible to imagine states like Virginia and Maryland (where cotton wasn't king and slaves were fewer and not regarded as crucial to prosperity) gradually giving up the "peculiar institution" under terms financed by federal money from the sale of Western lands. Besides paying off slaveowners, the government could have set up transition schools for emancipated blacks—faintly resembling current job-training courses.

In the Deep South, however, one has to try to imagine not only some change of heart, but some economic catastrophe. We used to be told by historians that by 1861 slavery was already a dying institution, bound to fall—quite apart from the cruelty and moral horror involved—because of its own economic inefficiency. Intense study in the past 20 years seems to have proved that interpretation illusory. Cotton continued as a big crop until

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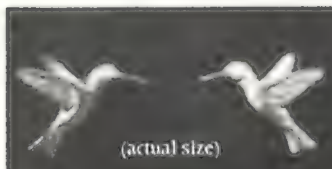
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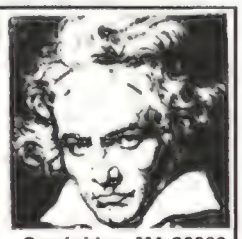

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the 1880s. The demand from Europe remained high, though increasingly cheaper cotton was being grown and exported from India and Egypt.

America did suffer economic crises in 1873, 1893 and 1907. Even with the greatest optimism, however, it's hard to conceive of enough economic dislocation to have led to the end of slavery on the first two of these dates. Even for that last date, no workable scenario by which emancipation could have come about seems to present itself. Counterfactualists are forced to fall back on a generalized—and therefore rather thin—hope. It is this: the antislavery movement was the greatest and most important international crusade of the 19th century. By 1890, slavery had disappeared entirely from what, with some reservations, could be called the civilized world. Gone from Cuba in 1886. Gone even from Brazil by 1888, just at the end of Emperor Dom Pedro II's 40-year reign. This was America, after all. Conceived in liberty and dedicated to the proposition that all men are created equal. Whatever the mechanics, however great the real and latent racism, could America have endured the shame of slavery a moment longer than Cuba and Brazil? Surely, the heart argues, we would have somehow found a way to end it in time to keep the Statue of Liberty—had France chosen to offer it at all in 1875—from being some kind of mockery.

Don't bet on it. In counterfactual speculation, the word "somehow" must be regarded as a wishful copout. In the past 20 years, naturally, the subject of American slavery—how it worked, how it might have been gotten rid of, how the condition of the serfs in 19th-century Russia or the blacks in 20th-century South Africa illuminate it—has been the concern of many scholars. Not much of what they have found encourages hope of early emancipation in the United States without either a Civil War or an economic depression so appalling that owners would have freed their

Scenario 2 suggests slower growth for the bureaucratic octopus.

slaves out of raw, financial necessity.

Few are as extreme as Arthur Schlesinger jr., who flatly declared in 1986 that, "had the states' rights creed prevailed, there would still be slavery in the United States." But most are hard put to create a working scenario for emancipation without force until well into the 20th century. Even then the presumption is that the condition of freed slaves would have been far nearer to total servitude than what we had—forced segregation with its degrading Jim Crow customs and discriminatory voting laws. Unlike the Russian nobility, the rich and powerful slaveowners of the Deep South were not decadent and often-absentee landlords, but tough, practical, belligerent and unabashed. They sought new land to spread slavery and its profits, some of them even scheming to take over Cuba for that purpose. Had Virginia and Maryland bailed out, one gloomy line of thought goes, what is known as the South African effect might have taken place. The remaining Deep South slave states, instead of changing, would have simply become more and more rigid, embattled and resentful.

The discussion is tortuous. It involves such things as the rate at which Southern soil might have become exhausted, and whether or not the South could have retained slavery

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and at the same time managed to industrialize. (Some scholars say yes, some say no.) A basic requirement would have been the existence of a major labor market outside the South to absorb large numbers of emigrating former slaves, which did not occur until World War I. And, at a shocking and depressing guess, it is not until then, under Scenario 2, that emancipation might have occurred.

"Of all historical problems," Henry Adams once wrote, "the nature of national character is the most difficult and the most important." Under Scenario 2, we would have wound up with the same land, but with a different character—different and better, some might say. We would certainly have had fewer martial memories and heroes. Washington at Valley Forge, yes, but no Perry on Lake Erie, no Jackson whipping the British at New Orleans, no Grant, no Lee, no Pickett's Charge and, above all, no Lincoln to use, and sometimes abuse, the by-then almost-dictatorial powers of the Presidency, riding roughshod over the 10th Amendment to the Constitution (which reserved for the states all powers not delegated to the federal government) so that, after much bloodshed, the 13th (which abolished slavery) could be written.

In the short term, the federalists were wrong about what would have happened if those eight delegates in New York and Virginia had voted the other way in 1788. For six decades thereafter, history kept proving the anti-federalists right. By 1861, however, the central powers they had deplored, and the federalists had claimed were crucial to the survival of the Union, suddenly proved to be exactly that. But in the interdependent, tinderbox world of 1988, in which democratic institutions seem highly vulnerable, Lincoln's famous question about whether a government so dedicated and so conceived can long endure is still something to be pondered.

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Book reviews

Rossetti and His Circle
Max Beerbohm
Edited by N. John Hall
Yale University Press, $19.95

"To give an accurate and exhaustive account of that period," wrote Max Beerbohm in an essay on mid-Victorian culture, "would need a far less brilliant pen than mine." Of course, the incomparable Max (as Shaw dubbed him) could never achieve the exhaustive or exhausting; his art was that of the sketch—whether as prose or picture—and always displayed a studied, yet easy, almost Astaire-like elegance. Today's readers know best the parodies collected in *A Christmas Garland* (the Henry James send-up "The Mote in the Middle Distance" is only the most famous), such delicious stories as "Enoch Soames"—about a now-forgotten 1890s writer who makes a disastrous pact with the devil—and the polished essay collections beginning with *The Works of Max Beerbohm*. But Max's lovingly barbed caricatures have been less generally appreciated, mainly because such volumes as *The Poet's Corner* have been out of print for decades.

Three years ago N. John Hall and Yale University Press issued a new edition of *Zuleika Dobson*, with Max's own marginal illustrations to his Oxford fairy tale, a comic rhapsody about a visiting beauty who drives the university's students to mass suicide. The same team now has reprinted *Rossetti and His Circle*, Beerbohm's most unified collection of caricatures, supplemented with historical notes, related drawings and photographs, and some brief essays.

Beerbohm once told a friend, "It is the period that one *didn't* quite know, the period just before oneself, the period of which in earliest days one knew the actual survivors, that lays a really strong hold on one's heart. The magic of the past for me begins at the 'eighties and stretches as far as the 'sixties." This was the heyday of Ruskin, Swinburne, William Morris, Whistler and, especially, the Pre-Raphaelite Brotherhood, headed by Dante Gabriel Rossetti.

Nowadays Rossetti seems a minor figure, the creator of those soulful, full-lipped, wide-eyed beauties—he called them "stunners"—that virtually define Pre-Raphaelite painting. He also wrote poetry—for instance, "The Blessed Damozel"—with a lush and often ballad-like character. His first inspiration for both painting and poetry was his mistress, eventually his wife, Elizabeth Siddal, who was "discovered" in a millinery shop; when she died (it was generally accepted that she committed suicide), a grief-maddened Rossetti thrust his poems into her coffin. Seven years later he ordered the grave opened. When published in 1870, the poetry enjoyed a great success.

This macabre side of Rossetti—along with his drug addiction, fear of blindness, insomnia and all-around paranoia—makes no appearance in these pages. Instead, Max focuses on Rossetti as the center of a group of decidedly oddball artists, models, hangers-on and charlatans. The ordering of the 23 caricatures proceeds from the early days of the Brotherhood and ends with a portrait of Oscar Wilde lecturing about the group in America.

Nearly every drawing (a blend of pencil and watercolor) shows a discordant encounter: a diminutive Swinburne, prancing excitedly like a child, pulls a tall and very serious Edmund Gosse along Cheyne Walk to visit Rossetti's house (above). A fat Rossetti—looking like actor Raymond Burr with a goatee—is introduced to a pencil-thin, rather ethereal John Stuart Mill. A bantam-size Whistler cockily displays an immense blue china vase to an overtowering and dour Thomas Carlyle. Often the texts are as bizarrely witty as the pictures. When rotund Benjamin Jowett accosts Rossetti in front of an Arthurian fresco, the famous don asks "And what were they going to do with the Grail when they found it, Mr. Rossetti?"

There is no need to be intimately familiar with figures like Burne-Jones, Watts-Dunton or Holman Hunt to smile at and savor these pictures. Hall's prefatory material explains the background of each caricature, drawing in part on the manuscript of Beerbohm's unfinished novel about this period, *The Mirror of the Past*. As an added bonus, Hall appends some of Max's related work, including the famous picture of Tennyson at the edge of a huge room, reading from *In Memoriam* to Queen Victoria, who is sitting stiffly on the far side, miles away.

Tiny Swinburne takes Gosse in hand with the "kindness of an elder brother."

Beerbohm produced more than 2,000 drawings and caricatures, but those in *Rossetti and His Circle* show him at his happiest. In this attractive edition they also provide the best possible introduction to the pictorial Max, as incomparable an artist as he was a writer.

Michael Dirda
Editor for *Washington Post Book World*

Every Day Remembrance Day: A Chronicle of Jewish Martyrdom
Simon Wiesenthal
Henry Holt, $25

One of the first things that Simon Wiesenthal said when we met in his cramped office quarters in Vienna was, "The history of mankind is a history of crimes." The well-known Austrian Nazi-hunter, who in 1980 was awarded a Congressional Gold Medal that proclaimed him "keeper of the flame to the conscience of the world," remains unshaken in this conviction. Who should hope to sway this of all men, whose life for the past 40 years represents a supreme act of belief?

Every Day Remembrance Day is the latest in Wiesenthal's compelling litany

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of Jewish suffering. In *The Murderers Among Us* we followed Wiesenthal's exploits as he exposed the Odessa organization (inspiring Frederick Forsyth's thriller, *The Odessa File*), hunted the Gestapo officer who arrested Anne Frank (a Viennese police officer, it turned out, whose office was ten minutes from Wiesenthal's), searched in vain for Hitler's chief deputy, Martin Bormann, and much more. In *The Sunflower* we became the young Jew brought to the deathbed of an SS man to hear his horrifying confession. *Max and Helen* is the true story of a pair of young lovers separated and imprisoned during the war. Stranger still is *The Secret Mission of Christopher Columbus*, in which Wiesenthal attempts to prove that Columbus was a Jew whose voyage was funded by Jews seeking a new homeland.

Every Day Remembrance Day should be subtitled a *calendar* of Jewish martyrdom. For every day of the year it lists anywhere from two or three to more than a dozen acts of anti-Semitism known to have occurred on that date throughout much of history. This is a monumental roll call spanning century upon century of horrors, from A.D. 38 to 1986.

Leaf through the pages: 1755, 1349, 1020, 1941, 1905. The Middle Ages are well represented, so too the 17th century and 20th-century Germany. Closing my eyes and choosing a page, I land on July 27 and discover that for this date 13 incidents are recorded. In 1298, 35 Jews were massacred in the "Rindfleish Persecutions" in Berching, Germany, while in nearby Bamberg—same year—more than 130 men, women and children were tortured, slaughtered or burned. In 1942, a train carrying 972 Jews left one camp, headed for another; the new camp—Auschwitz. Twelve of the 972 remained at war's end. The remaining ten entries all date from the 1940s. (I resist an impulse to search for another, "better" date offering more spectacular atrocities.)

Wiesenthal attempts to show "what can be seen as the underlying pattern of this particular history" in a lengthy and unconvincing introduction. He finds six motivations behind the thousands of incidents: hatred, dictatorship, bureaucracy, technology, crisis or war, minority as scapegoat. The thesis is weak. These may be contributing factors to acts of anti-Semitism—some more than others—but hardly a total explanation. For every technological advancement whose purpose is to snuff out lives, another, such as the polio vaccine, is developed to aid humanity. A bureaucracy may depersonalize its members, but it can also carry out massive humanitarian efforts. Fortunately, Wiesenthal does not attempt to apply his theory to the individual entries.

However weak Wiesenthal's explanations for anti-Semitism may be, by their very earnestness he does succeed in asking an old question with fresh vigor: What is the basis for racial hatred? The nearly 250 pages that follow offer no answers, only the voices of the victims. And these voices speak louder than any one person's words.

A writer who once worked with him joked that Wiesenthal spoke six or seven languages—none of them well. The present volume translates no better than his earlier works, yet the strength of his material always carries him through. Wiesenthal will be remembered best for *The Murderers Among Us*, but *Every Day Remembrance Day* holds its own as a monument of data that few others could have accumulated.

Its niche ought neither to be the library's history or Judaica sections or the rapidly expanding Holocaust shelves, nor the reader's coffee table or nightstand. *Every Day Remembrance Day* deserves a special spot to itself—or better yet, a place next to a Talmud, a Bible, a Koran. Like these, it can be reached for when you feel the urge to try your faith or, as Wiesenthal seems to suggest, to confirm your fears.

Bill Butts
Chicago writer

The Arts at Black Mountain College
Mary Emma Harris
MIT Press, $50

Black Mountain College was founded in 1933 in western North Carolina by a splinter group of professors and students from Florida's Rollins College. The group was led by my grandfather John Andrew Rice, a charismatic troublemaker whose vision was to combine the challenges of academic study, self-government, and training in the visual and performing arts. The student was to be treated as "a whole person," not as an arbitrarily divided "creative" self policed by a "social" self, with a "learner"—and teacher—hovering over both. This vision demanded self-rule and interdisciplinary courses combined

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with rich activity in the creative arts.

Although Black Mountain rarely housed more than a hundred persons, it is remembered for attracting a host of men and women who were or soon would become prominent in arts and letters. Some established figures were Americans—the painter Ben Shahn, the anthropologist Paul Radin and the music educator Thomas Whitney Surette. From the beginning, the college also hired German artists, philosophers, musicians and mathematicians who sought sanctuary from the Third Reich. The painter Josef Albers and the architect Walter Gropius, among others, made Black Mountain an early center of Bauhaus influence in the United States.

The college attracted offbeat talent, men and women who would have to wait years or even decades to become known. A short list of such associates might include musicians Carol Brice, Roger Sessions and John Cage, film director Arthur Penn, the ceramist Karen Karnes, painters Robert Motherwell, Kenneth Noland and Willem de Kooning, inventor Buckminster Fuller, writers Robert Creeley and Paul Goodman. They came not for glory but to work. What they found was a tempestuous community, vexed by cliques, conflicting egos and constant squabble.

Each man who led the college—Olson, Albers and my grandfather—saw his efforts fail. But always, Black Mountain was a plausible setting for exploring problems in art and life.

From its founding to its closing in 1957, the tiny academic colony flirted with disaster. (My grandfather, a fine quarreler in his own right, used to say that the college should have been housed in tents, the more easily to fold.)

During the stewardship of Charles Olson, what we now call rapid turnover and cash-flow problems finally proved fatal. Nevertheless, from the grave Black Mountain's reputation grew, especially among radical educators in the 1960s, for whom the college seemed a harbinger of their own innovations.

Black Mountain's occasional chroniclers—Charles Olson, Alfred Kazin and others—have tended to overheat themselves defending or decrying their subject. Martin Duberman, the college's first historian, used his book to try out a new kind of history writing. Among other innovations, he assumed the role of a member of the community, although he had never been there. Duber-

man's methods and his depiction of community life were poorly received.

What has long been lacking, then, is a thorough and balanced, scholarly study for those who wish to know more about the college. This deficiency is ably corrected by Mary Emma Harris in *The Arts at Black Mountain College*, a book so beautifully made that it speaks well of the elite end of the American publishing industry. Copiously illustrated, it is also meticulously researched, the result of Harris' many interviews and years of work in the North Carolina State Archives. She is an effective encyclopedist, providing biographies, explanations of modernist schools and succinct analyses of work done at the college in the fields of painting, sculpture, photography, textiles, architecture, writing, dance, drama and music. Harris is level-headed in her treatment of personalities and issues.

If she sometimes stints on the pleasures of history, Harris more than compensates in her eloquent epilogue, "Continuations." At a time of renewed public debate over education, one welcomes her reflections on the perils of innovation. Black Mountain's miniature democracy, its insistence on breaking with past models, and its effort to unite rigor and flexibility—these features could hardly have been better suited to its self-destruction. Or likewise to its peculiar successes—for imminent danger may be a boon to the special kinds of achievement for which Black Mountain is remembered.

William C. Rice
Michigan journalist

Honey from Stone: A Naturalist's Search for God
Chet Raymo
Dodd, Mead, $16.95

Chet Raymo regrets the divorce that separated religion and science into two disciplines and two aloof, occasionally hostile cultures, a division generally now taken for granted. In forcing Galileo to recant his belief that the sun, not the Earth, is the center of our universe, the Church, says Raymo, "cut itself off from participation in one of the great adventures of the human spirit—the flight of the human imagination with the soaring Earth into a universe of unanticipated majesty and mystery."

But science suffered too, and not only from the inconveniences of the Inquisition. According to Raymo, science's capacity for wonder and its potential for enriching the human spirit were diminished. Principally, science lost a means of expression: it was "deprived of access to the Church's rich traditional language of praise."

Raymo, a physics professor and astronomer at Stonehill College in Massachusetts and a columnist for the Boston *Globe*, keeps a summer home on the rugged Dingle Peninsula in the west of Ireland. Each essay in this collection of meditations takes its inspiration from walks through Dingle's relic-studded landscape: to a megalithic tomb on Caherard Hill or up Mount Brandon, where the ruins of an oratory testify to the legend of Saint Brendan the Navigator, a visitor to America "nearly a thousand years before Columbus." Somewhere on this finger of land that "has more antiquities per square mile than almost any other place in Europe," Raymo hopes to discover the "relevance

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of traditional religion in the world described by contemporary science."

On one expedition, Raymo examines the ancient Devonian and Silurian stones of Kilmalkedar Church. He reads the "walls of the church as I might read a geology text, or a hymnal," uncovering millions of years of history. In this monument to faith, he looks for fossils. One night on the road from Dingle town, he watches the annual Perseid meteor shower. Throughout rural Europe the shower is called the "tears of Saint Lawrence," after the early Christian martyr who is said to have defiantly declared, on the night he was to be roasted over hot coals, "Night has no darkness for me."

Raymo treads a fine line, seeking transcendence while rejecting mysticism. He visits Skellig Michael, an abandoned island eight miles off the coast of Kerry, where a monastery was occupied up to medieval times. Now the island is inhabited mainly by cloverlike sea pinks, puffins (birds that make their nests in rabbit holes) and storm petrels. He wonders what the monks found here, what kind of spirituality was grown on the island's windswept rocks.

In a passage somewhat sweet for my taste but expressive of his own world view, he decides that the "Skellig monks could not flee entirely into themselves. The Atlantic pressed them; the rock lifted them. They did not live in a 'cloud of unknowing,' but in a very real Atlantic mist. Their heat was in the sun and their sweetness in the hive. They clamped their anchorage to the rock and listened to the song of the wind. They colonized the Skellig crag like the sea pinks and stole their burrows like puffins. And, if I am right, they found the Absolute in the elements and took their pleasure and their knowledge from *things seen.*"

The excesses of Raymo's rhetoric suggest the limitations of praise. Here laid out for the reader are the wonders of the Universe—but also, alas, overblown writing, murkiness and straining for poignancy. Unlike Lewis Thomas' *The Lives of a Cell* or Raymo's own *The Soul of the Night* of 1985, *Honey from Stone* is less instructional than liturgical. You close this book not necessarily more informed, but perhaps touched by grace.

Ken Kalfus
Philadelphia reviewer

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Additional reading

Chimps (p. 36)

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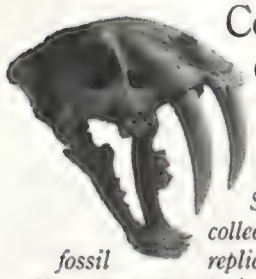

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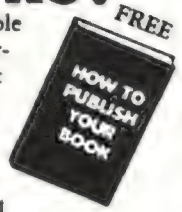

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Smithsonian highlights

Planning a Smithsonian visit?

The Associates' Planning Packet, brimming with helpful information, is yours for the asking; call or send a postcard to Associates' Reception Center, Smithsonian, Washington, D.C. 20560; (202) 357-2700 or TDD for hearing impaired (202) 357-1729. Begin your visit at the Associates' Reception Desk, relocated to the Arts and Industries Building during construction of the new Smithsonian Information Center in the Castle.

Extended summer hours

Five Smithsonian museums and the International Center on the Mall will have extended summer hours through Labor Day weekend (September 5). The museums of African Art, Air and Space, American History and Natural History, and the Sackler Gallery and the International Center will be open each day from 10 A.M. until 9 P.M. The Enid A. Haupt Garden will be open daily from 7 A.M. to 9:15 P.M.

The National Zoological Park will have its own summer schedule. Through September 15, the Zoo grounds will be open from 8 A.M. to 8 P.M.; its buildings, from 9 A.M. to 6 P.M.

Festival of American Folklife

The 22d annual celebration being held from June 23-27 and June 30-July 4 will focus on the traditional cultures of Massachusetts; how migration brought cultural diversity to Washington, D.C.; and Soviet and American musicians. Events will take place on the National Mall between 10th and 14th Streets. For more information call (202) 357-2700.

Special June exhibits and events

National Museum of African Art
Shoowa Design: Raffia Textiles from Zaire (June 15-August 7) See *Highlights continued* (p. 172).
Images from Bamum: German Colonial Photography at the Court of King Njoya, Cameroon, West Africa, 1902-1915 (June 15-September 6) Compelling photographs portray life in colonial Cameroon.

Cooper-Hewitt Museum (New York)
Paris Opera on Stage: Designs, Costumes, Jewels (June 9-September 25) Colorful costumes, set designs and models from the legendary Paris Opera.
Ceramics of the Weimar Republic, 1919-1933 (June 14-August 28) Commercial ceramics with Bauhaus-influenced, bright Art Deco patterns in premiere showing of a SITES exhibition.
The Outdoor Chair (through September 25) Enjoy museum's garden from any of more than 40 original chairs styled by San Francisco artists, architects, designers.

Arthur M. Sackler Gallery
The Chinese Scholar's Studio: Artistic Life in the Late Ming Period (through June 26) Some 130 objects from the Shanghai Museum present the world of China's 17th-century scholar-artists.

National Portrait Gallery
Masterpieces from Gripsholm Castle: The Swedish National Portrait Collection (through July 10) Paintings dating from early 1400s to the present.

Hirshhorn Museum & Sculpture Garden
Different Drummers (through August 14) The special contributions of nine idiosyncratic American artists since World War II (below).

Luis Jimenez's *The Sodbuster* (detail) is in the Hirshhorn's post-1945 exhibit.

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Renwick Gallery
Clay Revisions: Plate, Cup, Vase (through September 5) Three traditional ceramic shapes as they have been transformed into artworks by 26 artists.

National Air and Space Museum
Fly-by-night (Thursdays through August, 6-9 P.M.) Special demonstrations, tours and lectures for the whole family. *Focus on Flight* (June 1-August 31) Submit a photograph taken in the museum with an entry form listing rules from the Information Desk. Call (202) 357-2700 for more details.

National Museum of Natural History
Andrew Jackson Grayson: Audubon of the West (through July 14) Watercolors of birds in California and Mexico produced from 1853-69.

Lecture and Seminar Program

Smithsonian Research Expeditions, a stimulating new program, will begin in August. Associates can work and explore with Smithsonian scientists in field settings, laboratories and archives to collect, organize and interpret data. Their efforts will directly contribute to Smithsonian publications and exhibitions.

The first expeditions will include: excavation of an Early Man campsite in Colorado (August 1-14 or August 19-September 1); Idaho agriculture and rural lifeways (August 15-26); dynamics of an active volcano in Costa Rica (September 12-22); and Air and Space archival treasures at the National Air and Space Museum (July 31-August 22).

For more information, write to the Lecture and Seminar Program, 1100 Jefferson Drive, S.W., Room 3045, Washington, D.C. or call (202) 357-1350.

Smithsonian on the air

Radio Smithsonian: Features on this weekly half-hour series include excerpts from a concert of music by black American composers, a discussion of the Old Testament as a literary work, and highlights of the Quincentenary celebration of Columbus' voyage to the Americas. *Here at the Smithsonian*: Three-minute features in this TV series focus on the New Deal murals painted by artists to decorate government buildings, and on spineless wonders—ants, cuttlefish and octopuses—at the National Zoo.

To find out what stations in your

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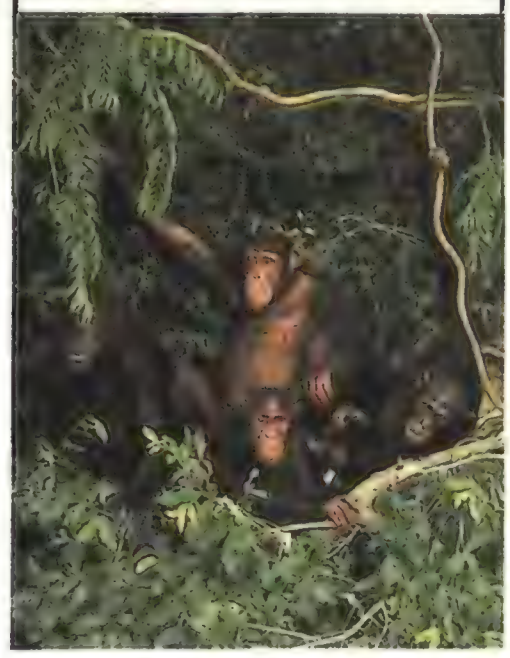

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Exhibition catalogs

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People of the Tropical Rainforest (paper, $19.95; cloth $39.95)

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Resident Associate Program

To become a Resident Associate, or for fee and ticket information, call 357-3030. Here are some June events:
Art and Artisans: A Celebration of Margaret Mead Film Festival (June 7, 14; 7:30 P.M.) Short films document the richness and diversity of human celebrations and artistic creativity.
Astad Deboo, Indian Dancer (June 23, 24; 7 P.M.) Performances by a boldly experimental, "new generation" Indian dance artist.

Smithsonian Institution Traveling Exhibition Service

SITES organizes and circulates exhibitions to cities throughout the United States and abroad. To sponsor a show in your community, write SITES, Smithsonian, Washington, D.C. 20560. Here are some June exhibits:
Dolores, Colorado (June 25-September 11) *Daughters of the Desert: Women Anthropologists and the Native American Southwest, 1880-1980,* Anasazi Heritage Center.
Fayetteville, North Carolina (June 5-July 3) *Portraits in Black: Outstanding Americans of Negro Origin from the Harmon Collection of the National Portrait Gallery,* Fayetteville Museum of Art.
Los Angeles, California (June 18-August 21) *Exploring the Planets,* California Museum of Science and Industry.
Scranton, Pennsylvania (June 18-July 17) *Baseball Immortals,* Lackawanna Stadium Authority.

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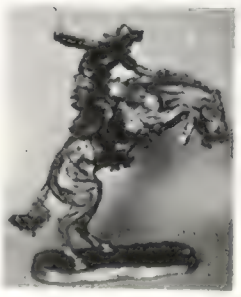

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Rich textiles from Zaire

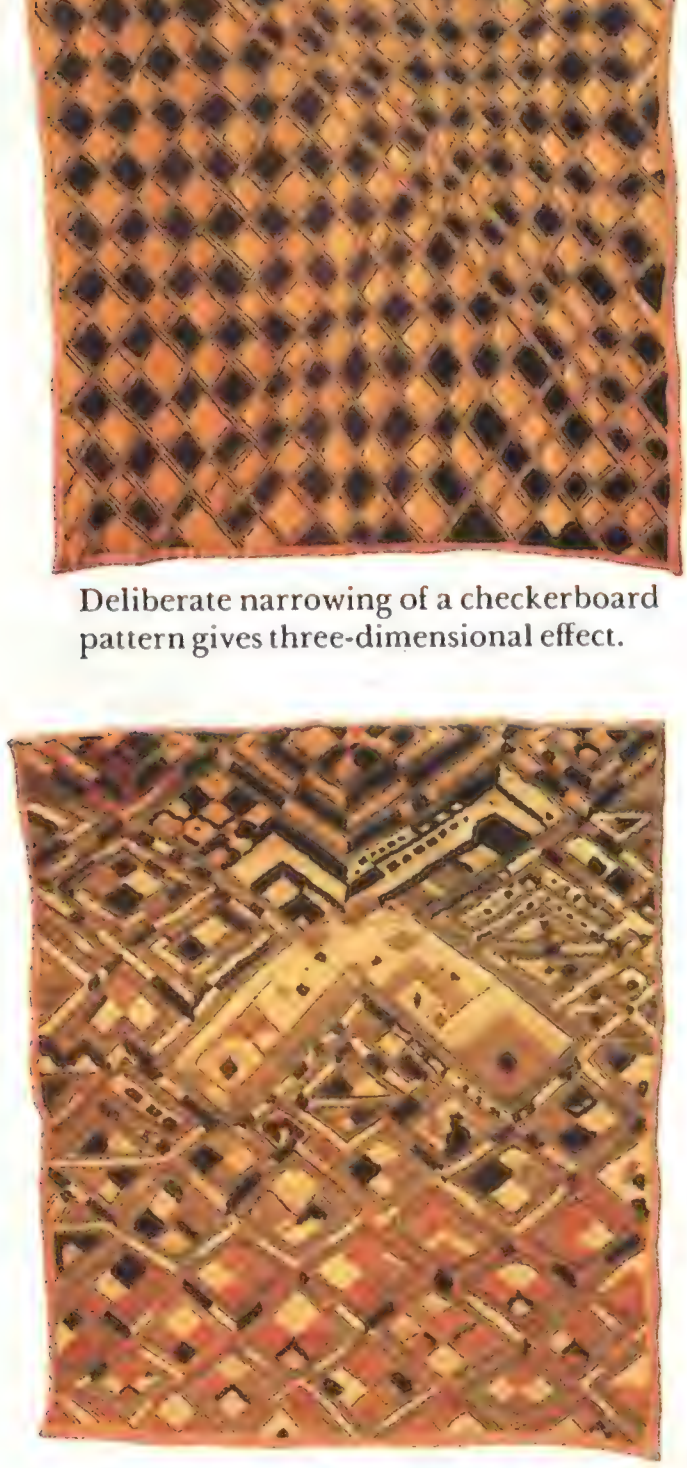
Geometric design in the European esthetic tradition is often the exact repetition of a pattern at regular intervals. The Kuba peoples of Zaire have never been inhibited by this rigid dictum, and the rich geometric compositions they embroider on raffia cloth seem to move and change the longer you look at them.

The embroidered panels are made in a tradition more than 300 years old. Raffia palm-leaf fiber is worked on vertical looms by the men into a plain, tight weave. The size depends on the length of the palm leaf, with panels generally 1½ to 2 feet on a side. The cloth is then wrapped, dampened with water, and beaten or kneaded to make it more supple. Embroidery yarns are dyed using local plants.

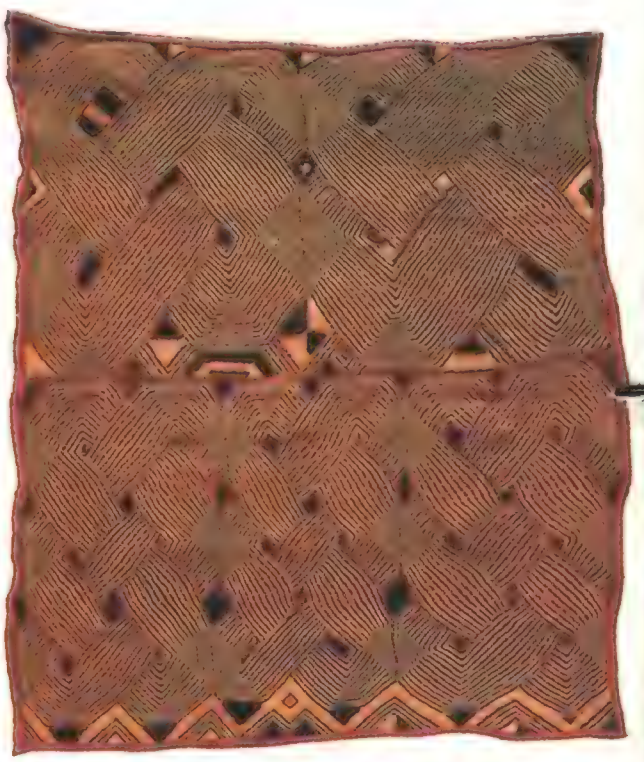
The women do the embroidery, usually in the afternoon after working in the fields. Patterns are never drawn on the cloth. Designs take form freehand in a combination of overstitch and a plush stitch that creates a velvet texture. One of the engaging aspects of Kuba designs is the deliberate break in the expected pattern, making them intriguing to study. Treasured possessions, the panels are used for ceremonial dress.

More than 100 raffia textiles created by artists from the Shoowa group of the Kuba kingdom will be on view at the National Museum of African Art from June 15 through August 7. The show, "Shoowa Design: Raffia Textiles from Zaire," was organized by the University of Michigan Museum of Art.
Sally Scott Maran

Deliberate narrowing of a checkerboard pattern gives three-dimensional effect.



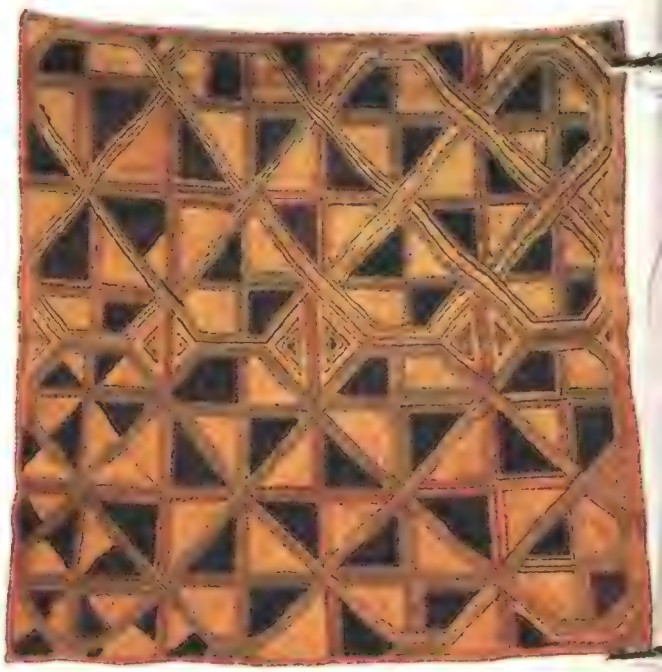
A sampler of motifs has variations on patterns, with no exact repetition.



Imbol motif, meaning basket-working or knotting, gives illusion of layering.

Imbols surround checkerboard with squares composed of plush triangles.

Combined plush stitch and overstitch add to visual complexity of a panel.



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By Donald Dale Jackson

'I need a list just to get through the day'

Everyone makes lists. Householders go to the market bearing lists of things like bell peppers, paprika, cleanser and herbal tea. Handymen make lists of chores—caulk tub, fix back-door lock, take trash to dump. Bird-watchers have "life lists"—a concept that always appealed to me—of the species they've spied. Most days I need a list just to get through the day; today's includes an item that says "try column on lists." We invent lists so we can cross things off them. It's a sign of an organized mind, or a compulsive one. Freud probably had an explanation for it, and frankly I don't want to hear about it.

But there are lists and then there are lists. The ancient Chinese were tremendous listmakers. They had a habit of dividing their history into lists ("The Era of the Five Dynasties and Ten Kingdoms") as well as their physical and spiritual world (the "five agents" —water, metal, wood, earth and fire— and the "five sacred mountains"). They were partial to numbered lists, the approach favored by *The Book of Lists* a few years back (15 famous events that happened in the bathtub, 14 preserved anatomical parts of renowned people). Others prefer alphabetical lists. In this style, Russell Baker listed 125 "things that could get you," ranging from acid rain to worn-out windshield wipers and including bald tires, Beirut, eating antique paint, and poor posture.

My favorite literary listmaker used to be F. Scott Fitzgerald, who once catalogued in a letter to his daughter the things she should worry about (courage, efficiency, horsemanship) and not worry about (boys, disappointments, flies, parents). But I have recently discovered a new champion, an obsessive listomaniac who in my opinion is the all-time, undisputed monarch of list-making, a tallier who raises the humble list to, well, an art form.

This paragon is a tenth-century Japanese writer named Sei Shōnagon. Shōnagon was a lady-in-waiting at the empress' court, a gossip and a snob, the author of a delightful journal called *The Pillow Book*, which is nearly half lists. Her lists were inspired. She didn't stop with catalogs of insects, mountains, bridges and games, all of which she faithfully set down. She listed "hateful things" (a flight of loud crows, people who speak with elegant language they don't understand, snoring in an unsuitable place), "things that give a pathetic impression" (blowing one's nose while speaking), "moving things" (a mountain village in snow, an attractive man or woman in mourning, old priests), "squalid things" (the inside of a cat's ear, a nest of newborn mice) and dozens of other phenomena that came under her somewhat disdainful but tidily compartmentalized gaze.

Her list of "rare things" included a bride loved by her mother-in-law, an uncritical servant, and a person "superior in both mind and body, and who remains flawless all his life." This is world-class listmaking. Among Shōnagon's "elegant things" were duck eggs, snow on plum blossoms and a pretty child eating strawberries. Fat people with a lot of hair, and zither bags made her list of "things that give a hot feeling." The lady's "pleasing things" included the piecing together of a shredded and discarded letter, and learning that "someone I dislike has had a bad experience." Listwise, Shōnagon let it all hang out.

What I like best about her lists is their revelation of her personality. Here is a woman who lived a thousand years ago, shrouded in the mists (and lists) of history, and what comes across today is a singular, idiosyncratic persona full of foibles and twitches and outrageous opinions—something you don't find much in the history books.

She had a category for everything. Want to know what depressed her? Dogs howling in the daytime and a badly painted fan ("Oh, the dreariness of it," she wrote). What made her heart beat faster? Sparrows feeding their young, and babies at play.

I wish Shōnagon were around today. There are a lot of things that cry out for her kind of listing. Harkening to her inspiration, I've made up a few Shōnagon-style lists. Humbly, I offer: Things That Should Be Placed in a Time Capsule the Location of Which Is Later Forgotten—invitations to resort complexes, plaid socks, plane tickets to Tehran. Things That Should Not Be Televised—insect races, situation comedies involving more than six teenagers, Jimmy the Greek. Weird Tiny Things—scallop eyes, the country of Andorra, thimbles, the lollipop king. Overrated Things—the corner of Hollywood and Vine, malls, nuclear submarines, judges. Things With Smells That Identify Them Even in the Dark—photographic darkrooms, chicken coops, new tennis balls, hotel lobbies. Excessively Sincere Things—corduroy, TV weathermen, letters from lawyers, the Sunday *New York Times*. Things You Cannot Do in a Snowmobile—play chess, take time-exposure photographs, compose Zen poetry, spear cockroaches.

You get the idea. I have to go see to the rest of today's list.

DEWAR'S PROFILE:

HENRY THREADGILL

HOME: Brooklyn, NY

AGE: 43.

PROFESSION: Composer; multi-instrumentalist; inventor of the hubkaphone; leader, Henry Threadgill Sextett.

HOBBY: Swimming. "It's the best way I know of keeping my head above water."

LAST BOOK READ: *Silence*, John Cage.

LATEST ACCOMPLISHMENT: Two new records: *Easily Slip Into Another World*, with the Sextett; *Air Show No. 1*, with Air, his other group.

WHY I DO WHAT I DO: "It was either make money or make music which for me wasn't even a choice."

QUOTE: "Tradition is a background of ingredients; in itself it's nothing. If you can't make something out of it, the world can do without it."

PROFILE: Intuitive, strong and as sharp an observer of his fellow man as his music would lead you to think.

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